The interaction with text of failing and normal readers

Thesis

THE INTERACTION WITH TEXT OF FAILING AND NORMAL READERS

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ABSTRACT

The research reported in this thesis was designed to investigate the nature of reading comprehension failure with a view to improving remedial reading programmes for those children who, although resembling normal readers in other respects, enter secondary education with an inadequate level of reading ability.

By the use of cloze tests, in which the reader is required to restore words deleted from a text, comparisons were made between failing readers at age twelve, normal readers of age twelve and normal readers of age nine who had reached the same level of reading comprehension as the failing twelve years old. The three groups' responses were classified by a system based on a view of the reading process as an interaction between the reader and the text. The effects of specific aspects of text on the three groups of readers were investigated. It was found that there were significant differences between the responses offered by the failing readers at age twelve and normal readers at age nine. Since the level of reading ability of the two groups was the same, this suggests that reading failure involves qualitative differences from normal reading development.

The types of difficulty experienced by failing readers, as reflected in their cloze responses, include difficulties of visual scanning, reconstruction of syntactic structures and vocabulary. These components did not affect all failing readers equally. Failing readers appear to have greater difficulty than normal in relating their responses to the general theme of the text and tend to treat it as a series of isolated fragments. They make less use of the context following a deleted word than normal readers. Failing readers at age twelve appear to have greater difficulty than normal readers at age nine in recognising which segments of a text contain important information.

The whole population of a secondary school, 643 subjects, was tested and it was found that failing readers at age fifteen produced the same pattern of responses as those failing at age twelve. The only improvement appearing in their reading was in the processing of complete sentences.

There were indications that remedial programmes designed on the diagnostic basis provided by the research results produced an increase in reading age in six months of a similar order to that produced by previous remedial programmes in a year. The increase was approximately twenty-four months on average for a group of failing readers whose mean reading age on entry was eight years six months. The programme caused them to alter their response patterns to resemble those of normal readers at age twelve.

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CHAPTER 1 READING FAILURE IN SECONDARY SCHOOL PUPILS

"The developmental question most directly relevant to reading problems is this 'To what extent has the reader acquired the ability to perform all the pragmatic tasks necessary for comprehension of connected discourse?'." (Morgan and Green 1980, p 134).

On entry to secondary education a significant number of children are found to be unable to make effective use of reading in the curriculum. By the age of sixteen, when they leave school, there are many who, although they have mastered the 'mechanics' of reading, have comprehension ages equivalent to those of normal ten or eleven year olds. It is with the failure to comprehend connected discourse that the present research is concerned. The aim of the research is to provide methods for diagnosing and remediating reading failure in older children.

The failing readers who form the focus of this thesis are children who have remained in the normal school system but have markedly failed to develop comprehension skills appropriate to their chronological ages. At age twelve, when the transfer to secondary education takes place in Scotland, reading ages are at least two years below chronological ages.

This study is not concerned with mentally or physically handicapped children nor with those described as 'dyslexics'. Pupils in the school population from which the sample has been drawn who have been diagnosed as specific dyslexics by psychological tests have been excluded from the sampling.

Many correlates of reading failure in non-reading areas have been investigated in other studies in the search for improved reading standards; a brief survey of research findings in these areas is included here as a background to the description of reading failure. Most of the factors identified in non-reading areas are outwith the control of the reading teacher. The behaviour of the reader during the reading process is however available for both observationand modification and the second part of this chapter therefore deals with previous discussions in the literature concerning the nature of reading failure.

I: FACTORS OUTSIDE THE READING PROCESS ASSOCIATED WITH READING FAILURE

The most recent large scale survey of reading development in Scotland, where the present study was carried out, is that of Maxwell (1977). Maxwell defined Poor readers as those whose score on a reading test was one standard deviation or more below the mean; by this method he assigned approximately fifteen per cent of the school population to the category of Poor readers. The category of Failing readers in the present study also includes approximately fifteen per cent of the population and may therefore, for the purposes of description, be regarded as a sample drawn from the population of Poor readers described by Maxwell.

i Socio-economic factors.

Maxwell found that reading progress was generally better in children of non-manual workers and was significantly associated with the amount of encouragement of reading in the home. Moon and Wells (1979) also

found parental influence to have the most significant effect on early reading. Bamberger (1977) in a survey of ten year olds in Austria found that working class children owned one third and peasant children (rural working class) one quarter of the number of books owned by children from higher social classes. The number of books possessed was closely related to reading achievement. Parental attitudes and interest in reading rather than simplistic social class attribution may be the determining factor in reading progress.

Rutter and Yule (1977) found that poor readers were more likely than good readers to come from large families, defined as those with four or more children.

The relationship between language and social class suggested by Bernstein's theory of linguistic codes has been shown by Lawton (1968) to be a difference in performance rather than linguistic competence in different social classes. Working class children'lack practice and therefore facility' in the handling of elaborate code choices. Since failing readers are more likely to come from working class families, this general language factor must affect the development of reading skill in the ability to handle both the language variety used in print and the language of instruction.

Despite these and other research findings regarding the relationship between social class and reading progress, many children from deprived or working class backgrounds do learn to read effectively thus indicating that a middle or upper class background is a facilitating rather than an enabling factor in reading development. In the assessment of reading, class differences in oral language are not

often controlled for. Poole (1972) found that a message created by a working class student gave rise to higher cloze scores, especially on lexical items, with first year university students. It may be that much of the research into reading failure has ascribed too general an area of failure and paid insufficient attention to the effect of test materials on children from different social backgrounds.

ii Emotional-motivational factors

Farr (1969) summarised the personality characteristics of poor readers as immaturity and a tendency to interact less often with others than good readers. It is difficult to ascertain whether these characteristics were pre-existent or were to some extent contributed to by the effects of reading failure on the child's self-image. The importance of the self-concept of the reader for progress in reading has been investigated by MacMichael (1977) and Wattenberg and Clifford (1964); their investigations related to beginning readers. The failing reader entering secondary school has suffered seven years of failure and the self-concept may have sustained considerable damage.

Personality characteristics which have been claimed to be related to reading failure are introversion (Rawsthorne, 1966 and Elliot, 1972), impulsivity (Carr, 1979 and Kagan 1965), lack of pertinacity (Lunzer and Dolan, 1979) and poor concentration (Rutter and Yule, 1977). The three last characteristics may contribute to a less sustained search after meaning in a text.

Kleck and Whaeton (1967) found that dogmatism was related to low comprehension scores and Pearson and Studt (1975) suggested that poor

readers were less likely to change a hypothesis once it had been formulated. This latter finding was also reported by Samuels et al (1975).

Tabarlet (1958) found that poor readers were immature, lacked personal skills and failed to participate in social affairs. Joseph and McDonald (1964) concluded that good readers sought achievement, change and affiliation while poor readers needed aggression, order and abasement.

Such generalisations must be seen as reflections of tendencies and not as pre-conditions for failure to learn to read. Like the socio-economic factors described above emotional and motivational factors cannot be seen necessarily as causes of reading failure and may in fact be effects of that failure.

iii Sex differences

Maxwell reported that boys dominated the group of poor readers in a ratio of 'at least fifty-five to forty five per cent'. Robeck and Wilson (1974) noted a tendency for girls who were poor readers to have lower scores on tests of oral vocabulary than boys of the same reading ability. This may indicate that the reading failure of girls is more likely to reflect a general language disability while that of boys may more frequently be a specific reading failure.

iv Reasoning ability

Maxwell's survey reported a correlation of 0.83 between results of the

Edinburgh Reading Test and Verbal Reasoning Quotient for pupils at age eleven. It gave no result for non-verbal reasoning tests.

The interaction between thought and language has been explored by the Russian psychologists eg Vygotsky (1962). Their findings may have overstressed the relationship between the two. Piaget and his followers recognised the linguistic mode of representation as one manifestation of the general symbolic function which enables the child to deal with situations outwith his present environment. They considered language as a reflection of cognitive processes rather than as a means of developing them. The nature of the interaction is unclear because it is difficult to test thought processes in a situation which is completely devoid of language.

Riding and Anstey (1982) compared the reading attainment of 'verbalisers' who interpret language by verbal association and 'imagers' who translate language into mental pictures. Verbalisers attained significantly higher scores on tests of both reading accuracy and comprehension. There were, however, items on which the imagers were able to respond more quickly than the verbalisers. This may indicate that, since the capacity of the text to generate an 'image' will vary, the content of the text will affect children who are imagers more than those who are verbalisers. Matz and Rohwer (1971) found a significant difference between black children of low socio-economic class who obtained high scores on questions dealing with pictures in books and white children from higher classes who obtained high scores on questions dealing with words. Imagery and socio-economic factors may therefore interact in their contributions to reading failure.

Thorndyke (1975) found that verb imagery value rather than conceptual complexity correlated with reading time for sentences. This would suggest that all readers are affected by imagery in texts although possibly to different extents. However Farr (1969), totalling the results of sixteen studies (N=803), using WISC tests found that poor readers had higher scores on tests of picture completion, block design, picture arrangement and object assembly, as well as oral comprehension, than on information, digit span, coding and arithmetic. His conclusion was that 'poor readers are not deficient in particular abilities but rather that poor reading has prevented the student from developing in certain areas'. The nature of the high scoring tests is such that all except one depend on the capacity to create a good image and it may therefore be that poor readers are more dependent on the use of images in their mental processes while good readers make more use of language.

Kellmer Pringle (1956) and Willows (1974) among others have made distinction between children whose performance on reading tests correlates highly with mental age and those whose reading performance is less skilled than would have been predicted from the results of reasoning tests. A similar distinction is made by Ingram (1970) between children whose difficulties are specific to reading and those who show general low attainment; all of Ingram's subjects were, however, underachieving in terms of their intelligence quotients. The group of failing readers may therefore include children of average or higher intelligence who underachieve specifically in reading, children of high intelligence who underachieve generally and children of lower intelligence whose reading ability reflects their intelligence quotient. The latter group are generally designated backward, the

others retarded. The failing readers in this study may include all three categories.

v Perceptual/Neurological factors

Gredler (1971) provides a discussion of the correlation between reading failure and lack of integration of neurological function. Lovell and Gorton (1968) found that the performance of backward readers was related to lack of neurological integrity and assigned forty-six per cent of the variance in their scores to this cause; normal readers' attainment reflected their general language development. Pumfrey and Naylor (1979) found deficits in auditory closure and visual sequential memory in a sample of sixty children referred as having reading difficulties before the age of eight. Moseley (1980) also found a deficit in numerical sequencing sub-tests of the WISC battery but concluded that weaknesses in verbal and spatial functioning did not occur more frequently in the group of children with reading difficulties than in the population as a whole. Westwood (1973) found that of fifteen independent linguistic and psycholinguistic criteria five were significantly related to reading achievement; these were vocabulary, auditory and visual closure and auditory and visual sequential memory. The reading test used tested word recognition but not comprehension. Cohen and Freeman (1978) found individual differences in reading strategies to be related to handedness and cerebral asymmetry. Bailey (1979) found that auditory perception training improved performance on tests of specific auditory sub-skills but not of word recognition or comprehension. Ingram (1970) reports a study of 82 children of average or higher intelligence who had reading ages two years or more below their

chronological ages. Sixty-two of the subjects were 'specific dyslexics' with difficulties only in reading and related areas. The remaining twenty had general learning difficulties. Factors which differentiated between these subjects and normal readers were a higher incidence of reading and spelling difficulties in the immediate family and, in the case of those with general learning difficulties, a higher likelihood of brain damage or cerebral dysfunction. Children with specific reading problems tended to make more errors of 'auditory-phonic synthesis' while the general group were more likely to make errors in the visual recognition of words. Retarded speech development was found in fifty per cent of both groups. Ingram concluded that 'an immaturity in even one of the basic perceptual or motor functions will have repercussions on one or all of the developments of language, the readiness to learn reading or the ability to draw.'

Doering reported two main areas of difference between good and retarded readers; one was the reading spelling area, the other was visual perceptual speed. His conclusion was that 'reading acquisition of retarded readers was not directly affected by all of their non-reading deficiencies' and 'it must be assumed that if the sequential processing difficulty were overcome the reading ability . . . would develop to a point where it was still limited by the deficiency of speaking vocabulary'. Bender (1968) suggested that children with a borderline impairment in the neurological area might compensate and learn to read in the 'absence of exogenous strains'. Olson (1980) after an investigation of the Frostig and Bender tests concluded that 'perceptual deficiency is likely to be a contributory but not a determining cause of reading retardation'. Since the failing readers

in this study do not include those who have severe perceptual or neurological problems the effect of these factors must be seen as contributory rather than causal.

vi Interaction

While none of these factors in isolation can be regarded as the cause of reading failure, the interaction of factors from two or more of these areas may be the basis of reading failure. Since these areas and factors cannot be controlled or remedied by the reading teacher, the basis of remedial reading programmes must be an investigation of the nature of reading failure. Account of the factors discussed above can then be taken in the design of remedial reading courses.

II THE NATURE OF READING FAILURE:

The comprehension of text by visual and mental processing implied in the term reading is achieved by the interaction of various processes which may or may not be regarded as separate skills or 'sub-skills'. The recent debate on the nature of comprehension is largely relatedto the labelling of the components of the reading process and to how far these are to be considered as independent of each other. In relation to the teaching of reading the debate is concerned with the decision to adopt a specific sub-skill training approach or to use whole reading tasks within which all the component processes are free to interact as in normal reading.

Where reading failure has occurred, however, it is necessary to diagnose the areas of weakness and strength within the reading process

and, in order to do so, a labelling of the interacting components is necessary. It is for this reason that these components are considered separately here. There is no implication that these component processes are taking place sequentially or in isolation from each other at any stage during reading nor that they should be taught in this way. The necessity for efficiency in each component and in combining them appropriately is a precondition for effective reading; it is therefore necessary to consider the components and their interaction in creating any diagnostic instrument.

The components considered here are visual scanning of print, word recognition - which includes the connection of the printed letter string with its meaning - chunking text on the basis of local structure, and the interaction which takes place between the reader and the text at deeper levels of processing. The pre-reading skills of auditory and visual discrimination and general language ability are also considered here as they too may contribute to reading failure.

i 'Pre-reading' skills

Failure in reading might logically be considered as one aspect of a general language deficiency and some research has been undertaken to examine the competence of failing readers in the use and understanding of oral language.

Killey and Willows (1981) have shown that less-skilled readers at fourth grade had difficulty in pinpointing errors in orally presented material although they were able to recognise that errors existed. Since decoding of print was not involved they argue that poor readers have a difficulty in coping with linguistic

structures in listening as well as in reading and are therefore still experiencing problems in processing local structure in both language modes. The passages used were however, originally intended as printed texts and the language structures were not those of oral language; it is not therefore possible to conclude that failing readers experience such difficulties in normal listening.

Golinkoff and Rosinski (1976) found that poor readers were not necessarily weak in semantic processing. They concluded that it was the decoding requirement of the reading process which gave rise to comprehension failure. Their research was conducted with single words and pictures and cannot be compared to the silent reading of continuous text. Wells (1979) found that differences in reading attainment at age seven were not significantly associated with differences in oral language ability on entry to school at age five.

Farr (1969) found low rating on vocabulary tests to be typical of children who experienced reading difficulties but Robeck and Wilson (1974) considered that this applied to girls but not to boys who failed to learn to read.

This conflicting evidence suggests that the nature of reading failure may not be uniform. Some children may fail to learn to read because of difficulties in coping with the vocabulary and structure of language in other modes while others experience no problems in oral language.

Problems of visual and auditory discrimination or sequencing also contribute in varying degrees to reading failure. Serafica and Siegel

(1970) found that some retarded readers were superior to normal readers on a test of visual discrimination. Doering suggested that some failing readers were likely to experience difficulties associated with visual processing and with language while others might experience only language difficulties. He suggested that non-verbal reasoning quotient might distinguish between the two groups. Readers with approximately equal verbal and non-verbal reasoning quotients would be proportionately less affected in language areas and therefore be experiencing specific visual difficulties. Where there is a discrepancy between verbal and non-verbal quotients, the contribution of language to reading failure may be greater and no visual difficulties need be present.

Ingram (1970) found that the most marked difference between subjects with a specific reading difficulty and those with general low attainment was in the high incidence of audio-phonic errors in the group of children with specific problems in reading. All of his subjects were of average or higher intelligence but a similar distinction must operate at lower intelligence levels.

Since children with above average intelligence with specific 'dyslexia' have been excluded from this study the group of failing readers may therefore include subjects with the following different patterns of pre-reading difficulty. The categories described below reflect tendencies rather than actual discrete groupings.

I Those with Verbal Reasoning quotients significantly lower than Non-verbal quotients including subjects with

a: Language based difficulties only

b: Language and visual problems

c: Language and auditory problems

d: Language plus visual and auditory problems.

II Those with Verbal reasoning quotients approximately equal to Non-verbal quotients including subjects with

a: Visual difficulties only

b: Auditory difficulties only

c: Visual plus auditory difficulties

d: Cognitive difficulties

e: Cognitive plus visual difficulties

f: Cognitive plus auditory difficulties

g: Cognitive plus visual plus auditory difficulties.

Subjects in group I may be 'imagers' interpreting language by mental pictures rather than word associations. Subjects in group II may have general reasoning deficiencies which may have hindered their educational progress. Both groups may also have considerable contributions to their lack of progress in reading from disrupted or inappropriate education.

Diagnosis of reading failure must be based on tests which allow these various factors to be observed.

ii Scanning

Visual scanning of a sequence of printed symbols is the first component of the reading process. The ability to move the eyes

quickly and effectively along a series of lines of print is essential if fluent reading is to be established. Practice will improve this ability and failing readers who may not have had adequate practice at sustained silent reading may have relatively more difficulty in scanning than those who learned to read at an earlier age. They may also have pre-existing difficulties of visual processing.

Farr (1969) found that failing readers' scores on tests of picture completion, block design and picture arrangement were higher than their scores on other WISC sub-tests. Visual difficulties of a general nature would have prevented this. Doering (1968) found that visual sequential speed was one of the main factors which distinguished between good and retarded readers. Mason (1975) showed that at sixth grade good readers were better than poor readers at identifying letters both in isolation and in words; both groups identified the letters more rapidly when they were presented in words.

Gough (1972) describes the reading process as a letter by letter mapping of the printed grapheme onto 'systematic phoneme strings'. The failing reader may have difficulties in the recognition of grapheme limits or in following the visual sequence in which they occur. Gough sees lack of speed in this decoding as a major reason for failure in comprehension; time taken to decode a word causes, in his view, loss from short term memory of the preceding context.

Eye-voice-span research has contributed significantly to the evidence regarding scanning. Levin and Turner (1968) found that the eye-voice span was longer for fluent than for less fluent readers. Grant (1981)

describes various types of visual problem associated with reading failure. The child may have difficulty in controlling the focussing of both eyes along a line of print because of 'binocular instability'. Fatigue caused by this difficulty may lead to breaks in concentration so that treatment of the text is fragmented. A narrower range of fusion of images from both eyes than is normal may lead to suppression of the image from one eye, while a wide range may cause difficulty in focussing. The child may experience double vision or a shifting of print. Grant ascribes plateaux in reading progress at age eight or nine and again at age ten and a half to varying degrees of severity in these difficulties. In his experiments Grant found that failing readers had difficulty in dealing with a five symbol sequence presented at reading distance in normal type face but not at three metres on flash cards. His subjects, retarded readers at age twelve plus, had no more difficulty than normal readers in dealing with four figure sequences under either reading or flash card conditions.

Leslie and Calfee (1971) found that the rate of scanning a simple list of words to match a target word did not distinguish between good and poor readers. This would appear to contradict Grant's findings since words of more than five letters could be located effectively. The element of meaning cannot therefore be disregarded even in observation of the visual scanning component of reading.

A word represents meaning and is unlikely to be held in memory as a string of separate symbols. Grant used the symbols 1, one, and X, cross, in random order; in isolation these symbols are meaningless. The sequences might therefore be processed as a single visual pattern, a sequence of separate symbols or a string of symbol names. Memory

was also introduced into the task set by Grant; each subject was required to count from one to ten before writing down the configuration he had seen. Difficulties experienced by these subjects may have arisen at stages other than that of visual scanning. The evidence of Leslie and Calfee would indicate that speed of scanning to find single words does not differentiate between good and poor readers but the format of the task may have removed certain basic features of normal reading. The meaning of the word did not require to be processed and the linear structure of normal text was absent; that is, words were processed in isolation at a purely perceptual level.

Riding and Pugh (19810 found that 'dark area threshold', the time it takes for a subject to register the disappearance of a visual stimulus, was also related to reading ability. A fast fading of the stimulus would result in slower scanning or in loss of visual information from short term memory. A slow fade may cause interference with later images. Either type of departure from the normal fade time would result in reading difficulty. Dark interval threshold was found to correlate with reading accuracy and with comprehension in girls at age seven and eleven and in boys at age eleven.

The importance of peripheral vision in the decision as to where to move the eye during the next saccade was stressed by Hochberg (1970). He considered that the reader's search of the print was partly based on his peripheral search guidance and partly on cognitive search guidance. Marcel (1974) found that the presence of a given context increased the angle at which details of print could be discerned. Poulton (1962) indicated that word shape information was picked up up

to nine spaces from a fixation and that word length information affected reading further into the periphery than either letter or word shape information. Rayner (1981) indicates a limit of fourteen to sixteen characters from the fixation to the right as the limit of effective vision. Failing readers may be less able to make use of the information picked up from peripheral vision in forming a percept of the print and in controlling eye movements. If as suggested by Just and Carpenter (1980) eye movements are related to text structures failing readers may not have learned to locate their fixations at those points in the text which will yield most information.

Klare (1957) found that the number of words read in one fixation was related to the difficulty and style of the text and to the ability and degree of practise of the reader. Levin and Cohn (1968) found that reading purpose also affected the length of eye voice span. Both of these factors may affect failing readers differently from fluent readers in so far as more texts will be 'difficult' for them to read, they have had less practice and their mental set for reading may produce a wrong idea of the purpose of the activity.

The amount of attention paid to print and the control mechanism by which it is focussed have also been considered in previous research. Weaver (1967) raised the question of the locus of control of eye movements. The movements may be direct responses to print units or they may be controlled by semantic processing. Underwood (1982) suggested that 'an unattended word may influence reading behaviour by guiding the eye to the next relevant location on the page'; the control mechanism envisaged is surface structure, although the evidence is considered by the researchers insufficient to confirm this

hypothesis. Willows (1974) inserted phrases related to the theme of the text in red between the lines. She found that this affected the oral reading of poor readers and caused them to make more errors in answering multiple choice questions on the texts. Good readers however made errors which included the material inserted between the lines. Good readers were better able to concentrate on the linear processing of oral reading in the presence of distraction but were also able to obtain more information from un-attended print.

Kolers (1970) showed that poor readers between the ages of ten and fourteen used frequent guessing and paid less attention to the printed stimulus in experiments with normal and reversed type than did good readers; he concluded that poor readers were relying on their own processing of the language rather than on visual input. This behaviour may have arisen as a response to difficulties in visual processing.

The factors influencing the visual scanning of a text are complex. While the contribution from the type of physical difficulty described by Grant cannot be neglected, the interaction between visual input and deeper levels of structural processing and the use made of information from peripheral vision in this interaction may make a considerable difference between the behaviour of good and poor readers. The balance between the use of visual and internal information may also be distorted by years of reading failure.

As suggested above, difficulties of visual origin need not be a component in the failure of all failing readers and diagnostic instruments should be capable of providing evidence regarding the extent and nature of such difficulty.

iii Word recognition

The scanning process identifies 'words' as grapheme strings bounded by spaces in the print. The process of relating these percepts to meanings stored in the reader's lexicon is generally referred to as word recognition. Unless this relationship is established the 'word' has not been recognised in any meaningful sense.

The question of whether every word is dealt with individually is pursued in the next section, 'chunking', but it is obvious that content words at least must be processed in this way. This section deals with the way in which the reader 'recognises' those words which require to be recognised. The grapheme string may serve as a visual stimulus which can be directly related to the meaning (Kolers,1970), or it may require to be translated into a phonetic representation by either oral or inner speech (Mattingly,1972).

Neville and Pugh (1982) describe oral and aural 'stages' in the development of reading. The oral stage involves actual pronunciation of the printed words while the aural stage involves reading silently but providing aural input for recoding into oral language (if necessary) to obtain meaning. The reader chooses, on the basis of the level of comprehension he feels he has achieved, whether meaning can be derived directly from visual input or whether aural, or oral, help is needed. Neville and Pugh consider that the nine-to-eleven year old age group appear to be involved in the transition stage during which silent reading of the type described is developed. Since the failing readers in this thesis have reading ages equivalent to normal middle school children, the degree of dependence on 'inner speech' may differentiate them from normal readers of Secondary School age. They

may also be less practised in deciding which type of input, visual, aural or oral, is necessary for understanding at different points in a text or less willing to vary their strategy.

Observations of lip and throat movements may provide a means of obtaining evidence regarding inner speech but, while they may indicate its presence, their absence does not necessarily imply the absence of inner speech. The question of whether words are being recognised directly from print or through a phonetic rendering can therefore only occasionally be answered.

Whichever form the stimulus takes, certain factors will determine the ease with which recognition is achieved. The size of the lexicon to which access is gained will vary with age and with reading ability. Farr (1969) found that low vocabulary scores were associated with reading failure. Belmont and Birch (1966) found that readers who were two grades below normal on tests of decoding and word recognition were only 1.5 grades below in paragraph comprehension; that is the word recognition failure was greater, and partly compensated for by the presence of context. The importance of the vocabulary factor in reading was the most definite finding of the various analyses of data produced by Thorndike (1973) in an attempt to isolate 'factors' in the reading process. The size of the failing reader's lexicon is another aspect of the process regarding which previous findings conflict.

The conflict may result from the difference in language mode in which the lexicon is tested. Whether or not inner speech is employed, the reader must be able to link the printed symbol with the lexicon. Perfetti (1975) found that the language mode in which a word had been

previously encountered did not affect the children's ability to recognise a word; the oral language lexicon was available for reading purposes. Goodman (1976) qualifies this slightly by saying that reading and listening at least for the literate are parallel processes. Mosenthal (1976) argues that 'oral reading does not access the same linguistic competence as does silent reading'. Doering (1968) concluded that failing readers were not necessarily deficient in spoken vocabulary. If a distinction exists between oral-language and reading lexicons it must be associated with difficulties of decoding printed symbols. Cromer (1970) found that some poor comprehenders possessed decoding skills as good as those of normal readers but studies by Killey and Willows (1980) and Golinkoff and Rosinski (1976) concluded that decoding difficulties made a significant contribution to reading failure at age ten. Failing readers may be unable to decode words which are present in their oral lexicon (Jorm, 1977) or they may use up so much of their available attention in decoding that they are unable to process meaning effectively (Craik and Lockhart, 1972: Perfetti and Lesgold, 1977). There is also a danger that overemphasis on decoding by phonic methods in early and remedial reading programmes may develop a wrong mental set. Word recognition failure may then arise from too much or too little attention to decoding at various stages of reading development, or from a deficiency in oral vocabulary.

Strategies used in word recognition may also contribute to reading failure. Mehler (1967) found that college level readers fixate on the first half of each constituent; they are presumably able to complete the sequence by visual or linguistic closure. Rayner and Hagelberg (1975) found that less-skilled readers also tend to concentrate on the

first half but they may be less able to perform the necessary closure to supply the ending.

Moyle (1978) suggested that readers may use four methods to recognise words. These were configuration, sound-symbol association, linguistic structure and meaning. Fluent readers make use of the most effective strategy for the word being processed. Failing readers may be unable to recognise the cues which would lead to an appropriate strategy or they may adhere rigidly to the strategy by which their early instruction was given, Barr (1975).

Much previous research and remedial teaching has centred on the word recognition component of the reading process. The above studies have however produced such conflicting evidence that it must be concluded that, as with the visual difficulties involved in scanning and the problems associated with 'pre-reading skills', word recognition difficulties are a possible, but not a necessary component of reading failure.

iv Chunking

Miller (1962) has shown that the human mind is limited in conscious processing capacity to six or seven 'psychological units'. In reading, these units may be equated with differing lengths of text segments. Where decoding difficulties are being experienced, they may be restricted to letter or grapheme length but in fluent reading they may reach phrase or clause length. If letters cannot be formed into words and words into larger units the processing of text becomes fragmentary and disjointed. Miller indicates that attention span may

be more efficiently utilised by coding one set of symbols into another; local surface structure allows such coding in reading. The 'chunking' of words into larger structures is that part of the reading process which allows surface structure details to be released from short term memory and enables deeper levels of processing to take place.

Mattingly (1972) considers that the primary representation recovered by the reader from the text is a partial version of the quasi-phonological representation of the sentence, a string of words which may well be incomplete and are certainly not syntactically related. He concludes that, on this basis, the reader forms a sentence by the use of the same primary linguistic competence used in speaking and listening. This is to suggest that the elements used in short term memory are retained in phonological form until a sentence is synthesised and verified. Mattingly rejects syntax units smaller than the sentence as a means for chunking text.

Buswell (1920) showed that eye-voice span was related to thought units rather than printed line units. In later eye-voice span experiments, even the youngest and poorest readers were found to be making use of linguistic structures in their reading; the average eye-voice span is longer on continuous text than on lists of separate words. Levin and Turner (1968) found that eye-voice span was longer for fluent than for less fluent readers and Kolers (1976) found that beginning readers made many more fixations per line than mature readers. The 'thought-units' used in chunking may therefore increase in size with age and reading ability, enabling the reader to encode words into phrases, clauses or sentences at different stages of development. The locus of control of eye-movements sought by Weaver

(1967) may be equated with the syntactic component of processing.

The control of syntax has been shown to continue developing until the age of thirteen, (Palermo and Molfese, 1972). Failing readers may have difficulty in recognising phrase, clause or sentence structures either because of this syntactic immaturity or because their attention is being concentrated at scanning and word recognition. They may be successful in reading to varying degrees depending on the elaboration or sophistication of the local structure. Cromer (1970) found that the comprehension of some poor readers could be improved by marking phrase boundaries to define chunks at phrase level. Failing readers may perform more like normal readers on texts in which the phrase structure is clearly defined.

Lesgold (1974) found that the semantic content of specific syntactic structures affected ease of comprehension and Richek (1976) found a similar interaction effect. Brown (1970) concluded that syntactic expectancies are guided by prior semantic information. Wanat and Levin (1968) suggested that grammatical constraints may operate on eye-voice span in ways that are more complicated than the direct surface form of the sentences and noticed different eye-movement behaviour on networks with the agent present from those with the agent not present. Wanat (1971) concluded that eye-movements were directed at a search for the agent in passive as well as active sentences. O'Donnell (1963) argues that only nineteen per cent of the variance in reading comprehension scores was accounted for by grammatical factors. All of these findings suggest that there is an interaction between meaning and the recognition of syntactic structures and that Forster

and Olbrei (1973) are in error in claiming a psychologically real level which is purely syntactic.

Failure in chunking during reading may therefore take the form of working with shorter text segments than normal, in greater difficulty in recognising the boundaries of structures or in failure to impose any structure. The degree of failure may vary with both syntactic and semantic features of the text. Perfetti and Lesgold (1977) showed that poor readers' short term verbatim store was not smaller than that of good readers and concluded that difficulties of local structure and word recognition played a greater role in reading failure than difficulties at higher levels of processing. Difficulties in chunking, like those of scanning and word recognition, will however result in a loss of information which may be essential for processing the meaning of the text.

v The interaction between the reader and the meaning of the text

Processing of the chunks of information formed from the printed stimulus requires a sustained interaction between the reader and the meaning of the text. Several factors affect the reader's ability to initiate and sustain this interaction and to comprehend the writer's meaning.

First, the amount of attention devoted to scanning, word recognition and chunking will determine how much processing capacity remains. Miller (1962) defined attention as the momentary capacity of consciousness and gave its capacity as approximately seven psychological units. In discussing the interaction between a reader

and a text, questions regarding the level of consciousness at which various components of the interaction take place must be raised. If the processing of meaning is not conscious, then demands on attention from the three previously described components of the reading process should not compete with the reader's on-going understanding of the text, although they may influence it through failure to identify or isolate relevant information. Various recent descriptions of the reading process are reviewed here to illustrate the degree to which the question of consciousness is basic to understandings of the process of reading comprehension.

Trabasso's (1972) model of reading involved three stages; these were the encoding of information in internal representations and the comparing of these representations wih those existing in the mind of the reader in order to determine a response. The third stage was the making of an overt response. Trabasso refers to the first two stages as mental operations but does not consider the question of consciousness. Gough (1972) presented a view of the reading process in which the reader is not a guesser, that he really plods through the sentence letter by letter and word by word. Those who, like Gough, subscribe to the 'inner speech' type of model of reading, generally postulate a 'primary memory' in which the surface structure of the sentence is stored at a level where it is available for conscious examination and analysis until it has been processed for transfer to deeper long-term memory.

In stating this view, Gough was essentially arguing against the extreme 'psycholinguistic' view of the reading process a more recent version of which is presented by, eg, Constance Weaver (1980) where

highly effective readers use preceding context to predict what is coming next; the most efficient readers are those who use a maximum of non-visual information and a minimum of visual information. The contrast is between the view of reading as a 'top-down', 'concept driven' process based on the reader's existing concepts and the predictions formed from them and a 'data driven', 'bottom up' process based on the data in the print.

Hawkes (1977) states that there exists no objective text and no pre-ordained content stored within it. Pugh (1981) states that the reader can make decisions as to what he wishes to do with what a writer has to offer.

Woods (1980) suggests that at any given time there are a number of competing possible interpretations of the text being sub-consciously processed by the reader. These hypothesis are formed on the basis of sub-sets of the input stimuli, that is, segments chosen from the text, and a set of rules for generating possible syntactic and semantic adjuncts for these segments. The competing partial hypotheses are formed and processed below the level of introspection; hypotheses are selected or discarded according to how far they are compatible with hypotheses at other levels. Failure in interaction under this system might be attributed to the inability to generate any or any relevant hypotheses and to the inability to inter-relate hypotheses on a number of levels. Woods points out that a reader whose only hypothesis was the correct interpretation of the text would have an easier task than a more advanced reader who was able to generate more hypotheses. This type of difficulty might arise for older failing readers who possess greater world knowledge and are

unable to process adequately the number of hypotheses which they are capable of generating. The generation of hypotheses and their number may be an area which contributes to reading failure.

Eco (1979) suggests that the meaning being processed is not 'actually present' to the mind of the reader but is 'virtually present' in a 'socially stored semantic encyclopaedia' to be picked up when required by the text. Reader's choices are determined by the topic of the text at the level on which the reader is operating; a text may have different topics at the levels of sentence, discourse and narrative. The fluency of the reader is determined by the ability to choose the correct level at which to operate, recognise the topic and select relevant meanings from the semantic store. No level can be processed in isolation but must take into account hypotheses regarding other levels. Interpretation at lower levels can succeed only because some hypotheses which concern upper levels, (and vice versa) are hazarded. The major difference between the views of Woods and Eco is that Woods envisages a number of partially formed hypotheses competing for processing while Eco argues that the nature of the text will determine whether one or many probabilities are being considered by the reader. Both systems envisage the reader adding to the visual input from the text both from his world knowledge and from his existing linguistic knowledge.

Sanford and Garrod (1981) following several researchers in artificial intelligence and computer modelling of comprehension have applied 'schema' theory to the reading of texts. The reader in beginning to read a text relates it to a 'schema' in his existing knowledge both of the content and of the language in which this content may be

represented. On the basis of this dual knowledge structure, the reader creates a model of the texts which contains slots into which objects or events can be fitted as they are encountered in the text. These frames are dependent on the recognition of the topic of the text, or, locally, on the structure associated with a particular verb. The process is one of 'concept-driven predictive comprehension'. The term 'scenario' is used to describe the extended domain of reference invoked by recognition of 'what the text is about'; like the theories of Woods and Eco the scenario account adds to the text as 'given information' those concepts retrieved from memory. The number of scenarios is not considered as changing as in the two previous views. One scenario will be active at any given point but the degree of specificity will depend on information from the text and alterations to the scenario will be made in the light of later information. If no scenario can be activated, primary processing will be delayed until sufficient information becomes available.

Like Eco, Sanford and Garrod stress the importance of 'foregrounding', that is recognising which elements are important for the comprehension of a text. Entities mentioned in the text are in 'explicit focus', those provided by the scenario are in 'implicit focus'. Explicit focus also holds information from preceding scenarios which have been superseded. Smiley (1978) found that beginning readers were not sensitive to varying levels of importance in the ideational units of a text.

The relationship between focussing and background knowledge is important. Applebee (1971) showed the strength of background knowledge effects in reading by giving children only the first noun

from a text. On the basis of this one word they were able to answer correctly more than a chance level of multiple choice questions. Dooling and Lachman (1971) found that subjects who were told the theme of the text before reading had better recall than other subjects. The activation of schema from memory may therefore play a considerable part in fluent reading by enabling the reader to foreground the correct elements. Material which is not foregrounded will be lost from explicit focus while the foreground will be carried forward to give coherence to the text. Van Dijk (1977) suggested that the good reader distinguishes and gives attention to those micro-propositions which are necessary for the construction of macro-structures.

An alternative to the hypothesis generation view is that of classical rhetoric in which the reader is seen as questioning the text, eg Gray (1977), Hatcher (1956). This method, like those described above, raises a distinction between 'given' and 'new' information. Questions must be based on given information, answers on new. The origins of the given may be in the existing knowledge of the reader or in the preceding section of the text.

Whichever method of description is used, the reading process is seen as an interactive one in which visual information from the text is compared with some form of existing knowledge structure. In order to make such comparisons, the reader requires to use a variety of strategies. Olshavsky (1976) reports ten such strategies used by twenty-four fifteen to sixteen year olds. Three of the strategies related to word recognition, six to clause level and one to discourse level processing.

Only one strategy above word recognition level was 'text dependent', the reading of the clause. The others involved the reader in performing the operations of hypothesis formation, guessing and inference all of which required the reader to supply extra information from existing knowledge.

Olshavsky found that good readers and those who were interested in the text used more strategies than poor or uninterested readers but not different strategies. There was more use of strategies on abstract than on concrete material. These results were obtained from introspective comments by the reader made after reading each clause silently. The ability and willingness to verbalise must therefore be regarded as a possible source of the differences; poor readers may have used the strategies but been less communicative. The level of consciousness at which the good readers worked is, however, noteworthy.

A further influence of hypothesis formation on the reading process will be reflected in the reader's ability to change a hypothesis once formed. Bruner and Potter (1964) found that it required more information to disconfirm a hypothesis about a picture than to recognise it when no hypothesis had been formed. Levin and Kaplan (1970) found that when a hypothesis was being disconfirmed closer sampling of the text was required than when it was being confirmed. Pearson and Studt (1975) found that poor readers were less likely to change a hypothesis once it had been formed.

The elements in the constructivist view of reading which may give rise to difficulties are basically the same under each of these systems of

description. Variation is present in the number and level of consciousness and linguistic expression in which the 'hypotheses', 'questions', 'scenarios' or 'predictions' are held. Failure may arise from lack of any constructive interaction with the text, from creating irrelevant 'hypotheses', from being unwilling to change a hypothesis, or from trying to process too many hypotheses at any given time.

A failing reader may consider fewer possibilities because of extra demands on his attention from other parts of the reading process or because of lack of relevant world knowledge or because he fails to recognise those elements in the text which carry the important concepts. An older failing reader may experience difficulty in processing a simple text because he can create more possible 'hypotheses' from his greater world knowledge than those children for whom a simple text is designed.

Failing readers who use imagery rather than verbalisation may experience greater difficulty in holding partially formed 'hypotheses' in memory; pictures require to be fairly concrete and this may also make it more difficult for imagers to alter a hypothesis once formed.

Failure to discriminate between important and unimportant segments of the text in terms of its logical structure may cause the reader to process more visual information from the text and to lose from short term memory concepts which are important to the formation of the macro structure.

In extreme cases the reader may fail to enter into any form of interaction with the text and view the reading activity as a decoding exercise.

The mental interaction involved in the reading process is less susceptible to observation that those which have gone before. The various views described above provide an explanation for observed behaviours; they cannot claim to be actual descriptions of the mental processing required in reading. If reading failure consists partly or entirely of failure at this level, the method of observation must involve the reader in making some overt response. The making of such a response may well interfere with normal reading behaviour. The observations made in the course of the studies which follow are all limited by this qualification.

III SUMMARY:

In previous studies of reading failure, observations have been made in several non-reading areas. Socio-economic, personality, intellectual and perceptual factors have all been found to be associated wih reading failure in some, but not all, cases. These factors may be seen as increasing the difficulty of learning to read but, since other children of similar type have learned to read, none of the factors on its own may be described as the cause of reading failure. Remedial reading programmes cannot, in any case, alter these factors. The concern of the thesis is to investigate the nature of reading failure at secondary school level with a view to remediation.

In order to design remedial programmes the nature of the reading process must be rigorously examined. Reading failure is defined for the purpose of this study in terms of failure to comprehend connected discourse in print. A failing reader is one who on entry to secondary education at age twelve has a reading comprehension age of two years

or more below his chronological age. Approximately fifteen per cent of the school population from which samples have been drawn come into this categroy.

Failure to comprehend a text may be attributed to various components of the reading process. These componenets are not to be viewed as acting separately nor sequentially but as interacting parts of reading behaviour. Individual failure may be caused by one or more of these components being inadequately or incorrectly established and by the interaction of the resulting difficulties.

'Pre-reading' areas which may cause initial failure or delay in reading development are auditory and visual discrimination or sequencing problems and deficiencies in oral language. Problems in beginning to read may cause more time to be spent on decoding, word recognition and oral reading and help to develop a wrong mental set for silent reading.

Scanning lines of print may present difficulties of accuracy or speed. These difficulties may be physical in origin; the failing reader may be unable to sustain a clear focus along continuous lines of print; or they may result from inabilities in the syntactic and semantic fields which direct eye-movements during reading. The failing reader may rely too much on visual information from the print and process more than is necessary or he may make guesses based on insufficient sampling of the print.

Word recognition difficulties may be attributed to faulty scanning, to problems of decoding, to restrictions on the size of the lexicon or to

lack of fluency in relating the printed symbol to its meaning. The oral language lexicon may be more frequently invoked by failing readers through the use of inner speech or may be significantly larger than the visual lexicon because of decoding difficulties. Failing readers may be more rigid than others in their word recognition strategies, relying on the method by which they were originally taught in preference to using linguistic structure and meaning as cues to unknown words.

In chunking, (ie the recognition or recreation of local structure), the failing reader may experience difficulties related to his oral language problem or to the size of text segment which can be retained in short term memory. Chunks for the failing reader may consist of seven letters or words instead of phases, clauses or sentences. The failing reader may depend more on recognising structures from printed information and less on applying linguistic rules to anticipate structure. The semantic content will also affect the ease of chunking.

Readers are likely to be conscious of failure in word recognition but may not be aware of errors in scanning and chunking.

Theories regarding the deeper levels of processing are numerous. If these processes are consciously carried out they will make demands on attention competing with those of scanning, word recognition and chunking; fluent readers who have acquired automaticity in any component of the process will have an advantage over failing readers in the whole process.

Most recent theories are constructivist in that they consider the reader as conceiving the nature of the text in some form before sampling visually to confirm or refine his 'hypothesis'. Expectations are generated at a variety of levels - word, phrase, clause, sentence and discourse, and hypotheses produced at other levels. Views differ as to the number of expectations in operation at any one time and as to how far the expectation is expressed in 'surface structure' language. Terms used range from 'prediction', which is used to describe a fully formed linguistic structure to 'scenario' which is a mental framework within which certain possibilities exist; these possibilities are selected or discarded in accordance with printed information and background knowledge.

The failing reader may not create any such expectations or he may create fewer or more than other readers. Having formed a hypothesis he may be less willing to change it than others. He may also be less efficient at recognising those segments of the text which should be fore-grounded; that is, those which contain logically important information. He may then have to sample more visual information and carry it forward over longer periods before he can accommodate it within a logical framework; or he may create an erroneous framework. Either of these strategies will cause information to be lost to long term memory and eventually cause the reader to lose the thread of the discourse and revert to processing of isolated segments.

Failure may also arise from an inability to move between levels of processing in response to the requirements of the text. The failing reader may be more rigid in his processing and less able to make use of structural markers to vary his strategy.

Contributions to reading failure may be visual, auditory, linguistic or cognitive. Each individual case of reading failure may involve one of these elements only but, more likely, interaction of more than one. A method of observation is required which samples reading behaviour during the reading process and provides for analysis overt responses. While any such procedure must necessarily interfere with the normal reading process, the cloze procedure was selected as a means of obtaining some insights into possible differences in response to a text between failing and normal readers during the reading process. Since the view of the reading process being used is an interactive one, it was also necessary to consider the influence of specific features of texts on normal and failing readers. Chapter 2 therefore deals with the use of cloze procedure and those features of texts which may be described in relation to readers' responses.

CHAPTER 2: CLOZE PROCEDURE AS A METHOD OF INVESTIGATING THE INTERACTION BETWEEN A READER AND A TEXT

The term cloze procedure is used in this thesis to refer to any test in which the reader is required to restore a word which has been deleted from an original text.

This method of investigation was selected because it samples readers' responses at various points during the reading of a text and is therefore free from problems associated with recall. 'The reader's moment to moment comprehension of a piece of discourse may be very different from the knowledge that the reader has at the end of the process after all the work has been done'. Brewer (1980) p230.

Alternative methods of investigation involving eye-movement observations allow conclusions to be extrapolated by the researcher but do not directly supply evidence regarding the syntactic and semantic information of which the reader is aware during his processing of the text.

The constructor of a cloze test must be aware of the various factors which require to be considered before using the procedure as a research tool. Although the concern of this research is with qualitative rather than quantitative differences between failing and normal readers, it is still of importance that the relationship between cloze scores and reading ability should be established.

I FEATURES OF THE CLOZE PROCEDURE

i What does cloze procedure test?

Taylor (1957) suggested that cloze score depended on general language facility, specific knowledge of content, vocabulary, ability to learn, attention and motivation. In all of these the failing readers described in Chapter 1 may differ from normal readers. Davies (1979) states that cloze tests are tests of a person's knowledge of discourse grammar, defined as 'the set of structures and relations' with which continuous discourse is carried out. This conflicts with the often presented view, eg Carroll and Freedle (1972), that cloze measures local redundancy, the degree to which a given word is unnecessary for understanding or the extent to which it is predictable from surrounding context. Weaver (1965) stated that readability as measured by the cloze procedure is measured primarily through lack of redundancy reducing capabilities of the subject.

Levenston (1983) illustrates the difference between deletions which can be restored on the basis of 'micro-structure', 'macro-structure' and 'extra-textual knowledge'. He considers the restoration of the latter as a 'pragmatic ability' that is not basically a reading measure. He argues that deletions which are 'cohesion markers' in the system devised by Halliday and Hasan (1976) (see below, Section II), test comprehension better than other deletions. A good reader, in his view, moves between use of local and discourse context in completing a cloze test.

There is general agreement that there is a basic difference between the 'random' cloze, originally proposed by Taylor (1953), in which

words are deleted according to a fixed numerical pattern, and 'rational' cloze, in which words are deleted according to some linguistic principle. Rankin (1957) found that random cloze correlated more highly with measures of intelligence than did deletion of only nouns and verbs. He concluded that deletion of nouns and verbs removed more lexical than structural constraints while 'nth word' deletion reduced structural more than lexical information. Doyle (1973) concluded that rational cloze sampled linguistic deep structure.

The choice of word for deletion will therefore contribute to the validity of the test and must be investigated.

ii Choice of deletion

Aulls (1971) suggested that the five significant elements in word recognition from context were the position of the word in the sentence, the bilateral distribution of meaning cues, the grammatical form class to which the word belongs, the standard frequency of the word and the syntactical structure in which it occurred. Since cloze procedure eliminates visual information regarding the deleted word, successful restoration must depend on the interaction of these elements. Earlier cloze studies have investigated some of these factors in isolation.

a **Grammatical form class**

Fillenbaum (1963) showed that form class affected ease of restoration. The syntactic constraints acting on different form

classes are of different strengths and structural difficulties of purely local nature will therefore vary between deletions. Secondly, some form classes contain a much wider lexicon than others and therefore require a more sophisticated search ability. Rentel (1969) found that classes which have restricted lexicons, prepositions, articles and pronouns, also tend to contain shorter words.

Schlosberg (1975) found an interaction between form class and position of word in sentence. Nouns were recognised more quickly if they were presented first and verbs if they were presented second. This reflects the common sentence order of subject-verb-object.

Louthan (1965) found that deleting words of certain classes, prepositions and conjunctions or pronouns and determiners, resulted in higher comprehension scores than the reading of undeleted text. The conclusions to be drawn from this evidence relate not only to the relative difficulty of restoring these form classes but to the nature of the process involved in such restorations. It is possible that deletions of differing form classes require different processes for their restoration.

b Position of word in sentence

Miller and Coleman found that words which occurred later in sentences were easier to restore. This result is of course related to the order in which words are constrained to occur by syntactical structures. Johnson (1967) has suggested that components of meaning may also be related to the position of words in the sentence.

Neville and Pugh (1982) distinguished between gaps near the beginning of sentences and those near the end. Scores for beginning gaps were lower than those for end gaps but good readers were better than poor readers at restoring beginning gaps.

c Standard frequency

The frequency with which words occur in the English language is obviously relevant in any study involving young or failing readers whose vocabulary may be restricted. Finn (1977) has indicated that this feature together with the text frequency, that is the frequency with which a word occurs in a given text, is related to the amount of information carried by the word and therefore to its redundancy. Klare (1963) concluded that word frequency was the best single predictor of reading comprehension difficulty. Loftus and Suppes (1973) found that the age of acquisition rivalled frequency as a predictor of a word's accessibility. Weaver (1977) suggested that points of high redundancy are points of control while points of low redundancy are points of lexical information. Some measure of the redundancy of a deleted word should therefore be obtained by looking at its description in terms of function, that is structural relationships, and content, that is lexical description.

d Distribution of meaning cues

Cues to the meaning of deleted words will be found at varying distances in the text. Two areas which may affect the ease of restoration are the need to use following context and the need to use information from beyond the sentence presently being processed.

Conflicting results have been obtained regarding the use of information from beyond the sentence in cloze procedure. Ramanauskas (1972) mixed sentences from different texts in random order in a continuous lay-out and compared the resulting scores with scores on the texts presented in their original form. Her subjects were mentally retarded and cannot be compared directly with the subjects of the present study although their reading ages were approximately equivalent. She concluded that cloze scores did reflect the use of information from beyond the sentence. Darnell (1963) re-arranged the order of sentences in seven variations and found that the degree of dis-organisation was reflected in cloze scores. Marshall (1970) also used cloze tests of randomly re-arranged sentences and found no significant difference between normal discourse and random sentences for hearing and deaf children of normal intelligence. His method may have made it possible for subjects to obtain cues from beyond the sentence in the random condition. He also fragmented the text in units smaller than a sentence and found that this did significantly reduce scores.

Carroll (1959) used fragments of text other than sentences, in this case ten-word fragments, thus violating local syntax as well as discourse structure. Even so he found that only twenty-six out of sixty items showed a significant difference between the fragmented and continuous presentations.

Chihara (1977) used cloze to investigate constraints across sentences in second language speakers and claimed that the use of information from beyond the sentence increased with the general language proficiency of the subject. His results may be questioned on two

grounds. Firstly, they do not take account statistically of the differing base level scores of the subjects ie the degree of improvement is not treated as a proportion of the base score but as an absolute gain. Secondly, the whole text was available in the 'scrambled' presentation. His graphs, Figs 1 and 2, also indicate that the result was not the same for native English speakers as for even the most advanced foreign language students in that the two texts produced significantly different gains in information.

Neville and Pugh (1977) fragmented texts in such a way as to remove access to following context. Each page of their test booklet stopped at a deletion. Scores under this condition were closer to scores on the same material given as a listening test than to those on cloze tests of reading in which access to following context was available. That is, bilateral constraints were acting during normal cloze tests of reading. The segmentation took no account of syntactic boundaries and should therefore represent a combination of syntactic and semantic disruption. Siler (1974) found that syntactic violation of a text caused significantly greater problems in oral reading than semantic violation although there was interaction between the two.

From these studies it is apparent that both distance and direction of cues from the deletion will affect cloze responses.

iii Rate of deletion

Alderson (1978) has shown that increasing the number of words between deletions does not produce a directly proportional effect. With native English speakers no consistent pattern of improvement was

obtained when the deletion rate was dropped from sixth to twelfth word. With non-native speakers sixth word was sometimes easier than tenth word and sometimes more difficult. Tulving and Gold (1963) found that amount of context and relevance to word identification made independent contributions to word recognition. Relevance may be related to either syntactic or semantic structures and the size of these structures rather than a fixed number of words may interact with the distance between deletions to increase or decrease difficulty.

iv Number of deletions

Taylor originally suggested that between sixteen and thirty-five deletions should be made to give a reliable result; he was basing this figure on the 'n^{th} word' system of deletion in which not all deletions are equally discriminating. Bormuth (1963) suggested that fifty items were necessary. In a rational deletion system where the concern is with qualitative rather than quantitative results the smaller number of items may be sufficient.

McKenna (1978) investigated the cumulative effect of incorrect responses on a cloze test of fifty items. By comparing the last fifteen items with the same fifteen items following un-deleted text he found that those readers who made most errors in the previous items were likely to increase their scores on the last fifteen items significantly more when the preceding context was undeleted; that is, there was a cumulative effect. McKenna ascribes this effect entirely to interference from previous errors. Since the length of the task and the extent to which the reader was enabled to tune-in to the topic of the text was also varied, it may be that these factors should have

been controlled in the design of the experiment. Suhorsky (1975) and Bartoo (1975) found that increasing the amount of undeleted material preceding the first deletion had no effect on cloze scores. This would suggest that recognition of the topic was not hindered by random cloze deletions. The effect of lexical deletions containing more information may be more significant.

Erickson and Hansen (1974) expected to find that later deletions benefited from the preceding context even when it was deleted but found that this was not the case. Since neither earlier nor later deletions have been shown to be affected by their position in the test, task length is the only factor which requires to be considered with regard to the number of deletions.

Since low concentration span has been shown to be a feature of failing readers the length of the task may be a critical factor.

v Physical lay-out:

McConkie and Raynor (1973) found that the length of upcoming words is among the earliest available information in the reader's visual periphery. The use of standard size gaps in cloze tests removes word length information and is therefore an additional removal of information. Word length information has been shown to convey form class information (Rentel 1969), and the use of standard size gaps may disrupt scanning patterns which may be directed partly by word length.

Rush and Klare (1978) obtained higher cloze scores by providing their subjects with dashes to indicate the number of letters in the deleted

word and thus reduced the degree of frustration felt by the subjects. Since failing readers generally have associated spelling problems this effect might not be apparent in their scores. Varying the length of the gap would increase the constraints acting on the subject and might prevent the recording of a response. Since this study is concerned with qualitative analysis of responses a standard gap may produce more material for investigation.

Since poor readers are more rigid in their approach to reading than good readers, the alteration to the appearance of a text caused by the physical presence of a gap may have a greater effect on them than on normal readers. For this reason the effects of physical lay-out should be studied.

vi Scoring systems and error analysis

In early studies involving the use of cloze procedure, only the restoration of the exact word deleted was considered 'correct'. This scoring system is referred to throughout this thesis as 'Verbatim' scoring. Miller and Coleman (1967) found that this method correlated with a co-efficient of 0.99 with other more complicated systems. Exact restoration is believed to involve the use of remote contraints. Alderson (1978) suggests that differences between scoring systems might depend not on different amounts of context but on the 'quality of context' or on different skills within the cloze procedure. Three investigations (Killey and Willows 1980, Willows and Blaxall 1980, Willows and Ryan 1980) add support to the view that good and poor readers differ qualitatively in their use of information from a text. The use of syntactic and semantic cues by skilled and less skilled readers in grades 4 to 6 is shown to vary significantly.

Alternatives to the exact-word, Verbatim, scoring system are synonym scoring which accepts as correct any synonym of the word deleted and semantically-acceptable scoring, shortened to SEMAC, which accepts as correct any word which grammatically and semantically restores the original meaning; SEMAC scoring accepts as correct a wider range of lexical choices than synonym scoring. Oller (1972) using a variety of scoring systems with second language students found that the SEMAC system correlated most highly with an English proficiency test in all aspects except vocabulary when compared with other scoring systems.

A third scoring system deals with the purely syntactic level. This is form class scoring, abbreviated to FC, which accepts as correct any word of the same grammatical form class as the word deleted. Fillenbaum (1963) suggests that this system depends on the immediate context of the deletion. Hafner (1964) found that this scoring system correlated less highly with measures of intelligence and vocabulary than did exact word scores; poor readers might therefore be expected to score relatively higher under this system than under either Verbatim or SEMAC systems.

Bormuth (1965) proposed a scoring system with seven categories of response ranging from the exact word, through synonyms which were gramatically correct, to grammatically correct responses which were semantically unacceptable and unclassifiable responses.

All of these systems look at the response in relation to the text; most systems of error classification have had a similar basis. Information regarding differential processing of text cannot be obtained from correct responses and error analysis is therefore essential for the purposes of this thesis.

Blenkhorn and Pugh, working at the Open University, have devised a computer system for the analysis of responses to cloze tests. Responses form a lexicon and each word is judged in eight respects in each of which they may be classified in only two ways eg right or wrong. Results are encoded as a group of eight binary digits. Each or any combination of the eight characteristics may then be investigated in relation to either individual subjects or individual gaps. The possibilities of this system for analysis of several texts and many groups of readers are considerable.

Weaver (1977) suggested that a proper interpretation of lexical cloze responses must involve some understanding of the formation and retention of concepts, problem-solving strategies, categorisation and heuristically organised retrieval schemes. In discussing cloze as a measure of comprehension, Russell (1978) suggests that the reasons for errors in cloze tests may not all be reading related. As well as problems of decoding and comprehension, frustration and other factors may interfere with the production of a correct response. By investigating the nature of these responses some researchers have tried to obtain more information from cloze tests.

Clausing and Senko (1978) devised a system of hierarchical points for various categories of response. They recognised three areas of constraint, context, grammar and orthography. Context was concerned with cultural-stylistic-semantic cues at sentence and whole text levels; scores vary according to four levels of acceptability which are defined only by specific examples. Grammar is concerned with syntax and morphology and points are awarded according to whether the response is one, two, or more than two components off target. The components are not defined. Orthography is basically concerned with spelling errors.

Neville and Pugh (1977 and 1982) and, following them, Rye (1982), distinguished errors on the basis of whether they were syntactically, semantically or morphologically inappropriate. One response might be inappropriate in any one or combination of these three areas. They also distinguished between responses which were suitable in terms of the total context, of only the preceding context or of none of the context. They found that a high proportion of errors of poorer readers were suitable in terms of preceding context. At a later stage the categories of response appropriate to the sentence in which it occurred or to only the preceding part of the sentence were introduced. This method of classification did not show any differences in the proportions of syntactic, semantic and morphologically appropriate errors between responses of good and poor readers. Poor readers however made more errors and left more omissions than good readers. The subjects of these studies were between nine and eleven years of age.

Willows and Ryan (1980) came to the conclusion that skilled and less-skilled readers made different use of syntactic and semantic information but that the pattern of errors of each ability group remained constant from fourth to sixth grade. These results are based on oral reading errors.

Guthrie (1973) using a cloze test with multiple choice responses found that skilled and less-skilled readers did not differ in the proportion of their choices which were syntactically and semantically appropriate. By contrast Weaver (1978) found that poor readers made more errors of incorrect form class than did good readers on a normal cloze task.

These confusing results together with the general finding that approximately seventy per cent of cloze responses are syntactically appropriate suggested a need for an error classification system which would both categorise errors syntactically and semantically and provide information about difficulties in the various components of the reading process outlined in Chapter 1 above. Because of the spelling difficulties experienced by failing readers and certain local dialect interference morphology and orthography have not been investigated in this thesis. The system of error classification developed during the preliminary studies is described in Chapter 6.

II METHODS OF DESCRIBING TEXTS

Since reading is seen as an interaction between a reader and a specific text, it was necessary to consider possible methods of text description which might be utilised in analysing responses to individual deletions.

It has been shown that cloze procedure can consistently differentiate between texts which are assigned the same level of 'readability' by traditional formulae. Variations in difficulty have been shown to relate to subject matter, McNinch (1974), language patterns, Ruddell (1965), and word frequency, Finn (1977). Willows and Blaxall (1980) demonstrated that difficulty of material affected error responses of beginning readers on reading aloud. Mosberg (1968) found that cloze was not sensitive at low levels of difficulty. Levels of difficulty must therefore be added to those features of texts which must be considered in the construction of cloze tests. Although various methods of text description are considered here and applied to the texts used in this study the question of whether research results

obtained on one set of texts can be generalised to other language samples has been discussed by Carver (1978) and remains open.

i Level of difficulty

Since difficulty level has been shown to affect the type of response offered by unskilled readers, Willows and Blaxall (1980), texts used as the basis for cloze tests must be at an appropriate level of difficulty for the subjects. This creates special problems in comparing failing with normal readers. To obtain valid results the failing reader must be compared with a normal reader of equivalent reading ability who will experience the same level of difficulty in reading the text. Such readers will be several years younger than the failing reader and will therefore differ from him in maturity, world knowledge and educational experience. To control the effects of these factors, the failing reader must be compared with a normal reader of equivalent chronological age who will find the test material easier to read. No single comparison can control all of the factors involved.

To assess the difficulty level of the text, traditional readability formulae may be used. Harrison (1980) after considering the complex formulae devised by various researchers concluded that the Fry graph, Fry (1977), was quite effective in age level prediction. The graph uses the variables of sentence length and number of syllables per hundred words to predict the grade level for which a text is suitable.

The cloze procedure may also be used as a predictor of readability; this was in fact the purpose for which it was designed. Betts (1957) suggested that a Verbatim score of less than forty-three per cent

indicated that the text was too difficult for the reader. Table 1 shows the relationship assigned by Betts and later researchers between cloze scores and other measures of comprehension.

Table 1: The relationship between cloze scores and other measures.

Source	Cloze score (%)	Comprehension level
Betts (1957)	Less than 43	Frustration level
	over 58	Independent level
Bormuth (1967)	38	Mult. Choice 75%
	50	Mult. Choice 90%
Rankin and Culhane (1969)	41	Mult. Choice 75%
	61	Mult. Choice 90%
Entin and Klare (1978)	31	Mult. Choice 75%
	36	Mult. Choice 90%
Entin and Klare (1978)	41	Mult. Choice 75%
	47	Mult. Choice 90%

Note: Entin and Klare's first set of figures were obtained with a solid line to represent deletions, the second set gave a line of dashes to correspond with the number of letters in the word.

Independent level is the level at which the reader is able to read and understand the text without any assistance. Frustration level is the level at which the reader experiences so much difficulty that he is totally unable to comprehend the text and makes errors on more than ten per cent of the words.

These figures were obtained by Verbatim scoring on 'n^{th} word' deletions and cannot therefore be applied to rational cloze tests nor to any other scoring system. Since rational deletions are generally more difficult to restore, function words having been removed from the deletion bank, lower scores might be anticipated.

It is however necessary to ensure that before qualitative comparisons are made quantitative measurements have been reliably applied.

While a Fry graph and the cloze scores of the subjects will give an indication of the overall difficulty of the texts, the purposes of

this study require a more detailed method of text description. Such systems may be conveniently arranged according to the size of text segment on which they are based.

ii Word level text description

Gray (1977) gave the definition 'to read well is to perceive the subordinate units in a composition and to understand the precise way that they are structured to make a unified whole'. The basic subordinate unit of any text as it appears to the reader is the word.

Finn (1977) proposed a model of text description based on the 'transfer features' of individual words. These were features which constrained related features of other words. The number of transfer features acting on a word determine the amount of information it carries; the amount of information is proportional to those features of the word not supplied by transfer features. Finn acknowledged that the whole system of transfer features was dependent on the reader's correct perception of syntax. Individual words are considered not as separate entities but as related parts of a structure. Kolers (1970) found that reading errors decreased over the final three-fifths of a sentence; this must relate to the number and type of transfer features operating from the preceding words. Marks (1967) concluded that the first few words of a sentence were more constraining than later words and Rothkopf (1963) found that the right hand part of a sentence was recalled better than the left hand part. It would appear that the consideration of single words is an inadequate method of text description. Those factors of words which have been considered under the heading 'Choice of deletion' will however affect the reading process. These features are grammatical form class, position of word

in sentence, standard frequency, distribution of meaning cues and syntactical structure in which the word occurs.

The combination of these features gives rise to the degree of redundancy of the word. Redundancy is the total effect of syntactic and semantic structures in constraining the word appearing at a given point in a text. Weaver (1965) distinguished between structural and lexical redundancy and suggested that while structural redundancy was higher in the reading than in the listening situation, lexical redundancy was similar in both modes. A printed word has therefore more cues to its structure than a spoken word, but, once the structure is recognised, the relationship between the word and the lexicon is equally easy to establish in both tasks. This of course assumes an absence of decoding difficulties in reading. In an investigation of the reading task, the structural rather than the lexical features may cause variations in processing which are different from those of oral language. For this reason descriptions of texts in terms of segments longer than a word are likely to be more useful.

iii Proposition level text description

Kintsch (1975) following Fillmore (1968) presented a method of deriving a 'text base' from the propositions of which the text is composed. In two parallel experiments, the first using history texts, the second science texts, they found significant differences as well as significant resemblances between results for the two types of text. Factors which were significant in determining difficulty in the texts used were number of propositions, number of different arguments and degree of embedding. Arguments are the concepts related by the predicate of a proposition; embedding is the occurrence of one

proposition as an argument in another.

Differences in results between science and history texts were ascribed by Kintsch to background knowledge effects. This would determine the amount of information in a text which was new to the reader. Kintsch also raises the question of other unknown factors which need to be taken into account in explaining the differences between the two types of text.

While propositional analysis provides a description of the amount and organisation of the information in a text, it does not describe the linguistic structures in which the information is encoded. Intuitively, the reader would consider that a proposition which adds an adjective to a noun will generally be easier to process than one which specifies a causal relationship between propositions. As Kintsch states the theory is incomplete in that it has no way of generating the original set of propositions or its theme for which we rely on intuition.

iv Phrase level text description

Generative grammars regard noun and verb phrases as the two main constituents of description of semantic deep structure, Fodor (1977). This level of text description is important in the present study as it relates directly to the 'chunking' component of the reading process. Spache (1976) considered that interpreting phrases was a completely mental act but that the nature of the phrase must exercise some constraint on its processing. Anglin and Miller (1968) considered the role of phrase structure in comprehension as measured by recall and found that the complexity of phrases within a sentence determined its

difficulty. Clark (1965) found that, in a study of active and passive sentence completion tests, choices were determined by cues at phrase level. The ability to identify and process the phrase is therefore important for reading comprehension.

Differing views have been expressed as to the basis on which sentences are segmented for processing. Click location studies have suggested that segmentation may be achieved on the basis of either surface structure, (Chapin, 1972 and Toppino, 1974) or deep structure (Bever, 1969). Flores D'Arcais (1978) suggests that the clause is the perceptual unit on which the processing of complex sentences is based and that there may be differences in processing related to the order in which clauses occur and to the distinction between main and subordinate clauses. Carroll (1978) suggests that sentences are segmented on the basis of 'functionally complete sequences' constructed by the listener on the basis of a variety of cues including noun-verb-noun configuration, inference from context and local cues at the level of the word and the morpheme.

The ways in which the reader identifies and processes text segments within the sentence must represent a major contribution in the processing of text and therefore requires to be investigated.

v Sentence level text description

Bormuth (1966) showed that similarity of written sentence structure to oral sentence forms improved comprehension for poor readers. The sentence must therefore be a main focus of any study of reading failure and has long been regarded as a basic linguistic unit.

Readability formulae have generally been based on the premise that long sentences are harder to process than short ones. This factor relates to the number and type of segments within the sentence but does not necessarily take account of their relationship to each other.

Chafe (1972) indicated that the verb is the 'heart' of the sentence and implies much of the rest of it. In the description of reading by Sanford and Garrod (1981) it is the verb which creates a structure of slots into which other linguistic units must fit. Thorndyke (1975) suggested that the ability of the verb to create an image, rather than the complexity of the structure, correlated with reading times for sentences. The ability to process sentences must therefore be seen as intimately related to the main verb in terms of both meaning and structure and an investigation of the ability to identify and process verbs may yield evidence regarding reading failure at sentence processing level.

vi Beyond the sentence:discourse structure

Smith (1982) has stated that the conventions the author observes regarding the general organisation of the book must be anticipated by the reader. This stress on a shared set of conventions is a re-statement of the more structured descriptions of other writers. Neville and Pugh (1982) state that 'the adult comes to be able to recognise these structures and to read accordingly'. It should therefore be possible to describe and classify these structures in order to diagnose accurately their effects on normal and failing readers. The reader who has no strategy for dealing with such structures will be unable to comprehend connected discourse.

'A common feature of the discourse structure analyses to date is that text structure is treated as though it were an inherent, immutable attribute of the text, interpreted in the same manner by all readers', Goetz and Armbruster (1980,) 214. This argument may be valid in so far as an interaction between reader and text must depend on various individual characteristics of the reader but to argue than no structure is inherent in the text is an overstatement. Hansen (1975) described criteria for discourse analysis in relation to the reading process. The method should be a practical one based on a theory of performance rather than competence. It should not establish artificial boundaries. It should be powerful enough to discriminate the major qualitative differences in discourse and it should be measurable. His own method of 'modified Packard analysis' is based on nodes and clusters of varying degrees of subordination to the main idea, connected by six types of conjunction between clauses.

Tierney and Mosenthal (1980) list five methods of text analysis: story grammar, event chain formation, predicate structures, mapped patterns and cohesion. Van Dijk's (1977) system based on complex logical formulae views the macro-structure of discourse in terms of a series of 'frames' made up of propositions. A hierarchy of levels relate sequences of propositions some of which provide the topic of the frame while others expand it. Macro-structures are sometimes expressed directly as topic sentences, are linked by connectives and are involved in the system of reference.

Frase (1972) identified levels of knowledge on the basis of the number of sentences from which information and inference had to be combined to obtain the knowledge. Level 1 was knowledge from within one sentence, Level 2 from the combination of two sentences and so on. He

found that Level 1 assertions, that is those based on only one sentence, were more readily recalled and the higher the level, the fewer the assertions recalled.

Becker (1965) identified both semantic and syntactic constraints operating at paragraph level. Semantic constraints included lexical equivalents and transition words, while syntax affected verb form sequences. Bormuth (1970) defined sixteen relationships between sentences with which the reader must be able to cope. In 1975, Robinson defined ten different paragraph functions and a large number of different specific writing patterns used in various subject areas. He then outlined strategies to be taught to students to help the reader unlock the ideas within each pattern of writing.

The number and variety of these systems makes it impossible to apply all of them to texts being used in the diagnosis of reading failure. Those which have been chosen and adopted here are relatively well known, easy to apply and between them cover most of the types of discourse analysis listed by Tierney and Mosenthal (1980).

a Cohesion: Halliday and Hasan (1976)

Cohesion occurs where the interpretation of some element in the discourse is dependent on that of another. There are five types of cohesion recognised by this system; reference, substitution, ellipsis, conjunction and lexical cohesion. Cohesive ties are formed by these methods between two or more segments of the text. Nunan (1983) tested cohesive ties of reference, conjunction and lexical cohesion at the within sentence and between sentence levels on tests of science texts and fiction. He found that within sentence cohesion was more

frequently recognised than more distant cohesive ties, irrespective of which type of cohesion was involved. Reference items were however easier to restore than conjunctions in cloze tests. He also found that a fiction text with an unknown background was more difficult to process than a science text, Nunan (1982). There will therefore be an interaction between the nature and distance of the cohesive ties and between the cohesive system and the content of the text.

Chapman (1981), in cloze tests involving deletion of cohesive items, found that average readers at age fifteen gained more in terms of cloze score from the presence of that part of the text which contained both parts of the cohesive tie than did good or poor readers. Only good readers gained more information from the presence of the whole text than from the segment covering the cohesive item. Average and poor readers made lower mean scores in the presence of the whole text than they did when only the 'cohesive section' was present.

Huddleston (1978) in reviewing Halliday and Hasan's book criticised their system on several grounds. Firstly, reference between two elements within a text cannot be regarded as similar in kind to the exaphoric relationship between an element in the text and its referent outside the text. Secondly, he argued that anaphora might include more abstract relationships in which anaphor and antecedent may not be identified at surface level. Thirdly, the distinction between reference and substitution is not always clear. Fourthly, lexical cohesion cannot be subsumed under the head 'anaphora' without broadening this notion to the point where it is no longer explicable. Lastly, he suggests that it is not the definite article alone which

forms an anaphor but the whole noun phrase of which it forms part. While the validity of these criticisms must be recognised, a system which provides clear descriptions of connections between text segments must be of use in following the progress of a reader through a text and the system has therefore been applied to the texts used in the main part of this thesis.

b Semantic Networks: Frederickson(1975)

This system reflects the importance of the verb in creating networks with systems of case, state, manner, location and time. Relations restrict the ways in which slots in these networks may be filled. Some slots must be filled, and are termed 'obligatory', while others may remain unfilled. In addition to the semantic network, Frederiksen defined a logical network required to represent relative, negative, logical and causal links. Although he stresses that network structures are not proposed as components of a linguistic description of texts but as data structures or models of memory structure, the reader must be required to activate such structures in relation to the text if adequate processing is to take place. In particular, since the first distinguishing feature of both objects and actions under his system will affect the subject's capacity to form an image, evidence regarding imagery may be obtained by application of this system. Actions are divided into resultive actions and processes while objects are divided into processive and static categories. A static object may be imaged directly while a processive object requires a verb to enable a representation to be formed in a picture. Similarly a verb of resultive action with the result stated presents a complete picture; a process labelled in isolation from its setting requires additional information to be added for the formation of the picture.

The importance of logic to the processing of text is also a feature of this system which renders it worthy of investigation.

c Functions Within a Text: Barthes (1980)

Barthes' system was devised for the analysis of narrative. It envisages three levels operating within the text. These are the levels of functions, actions and narration.

Functions are units of content which have meaning because they occupy places in the actions which are given meaning by the narration. The function may consist of a word or a morpheme or of a segment of text longer than a sentence or any unit in between. In this respect it resembles Carroll's (1978) functionally complete sequence within the sentence.

Functions relate to other units at the same level. Integrational units, indices, refer to higher structures in the narrative indicating concepts which need not be explicitly stated. They provide indicators of personality and atmosphere. Functions are divided into cardinal functions of 'nuclei' which are of direct consequence to the gist of the text and 'catalysers' which add details to the main points introduced by the nuclei. Indices are divided into 'informants' which relate to real world features of identity, time and space and indices proper which deal with abstract areas.

The nuclei constitute points at which the logical framework of the text may be altered. The other types of function represent expansions around this framework. The ability to recognise nuclear functions is basic to the questions of fore-grounding and focus raised in Chapter 1. Downing (1979) considered that the inability to identify the main theme of a text was a common problem. Grant and Hall (1968) found

that poor readers needed instruction on the relationship of details to the general theme. Pfafflin (1967) showed that adult readers were able to distinguish between topic and non-topic sentences when these were presented in isolation. Hershberger and Terry (1965) found that printing nuclei, or 'core content' in red and the rest of the text in black improved comprehension. Smiley (1977) found that good readers recalled more of the important themes at various levels within a text than poor readers except at the most important level. At subordinate levels poor readers recalled the same amount of material at each level irrespective of importance. Stebbin and Raban (1982) found that a 'strong story line' helped young readers to develop appropriate strategies.

Since the present study deals with an apparent breakdown in the logical processing of text, it may be important to identify the relative importance of those points in the text at which such breakdowns are likely to occur. Barthes' system provides a basis for describing text segments in terms of their relative importance to the logical development of the text.

d Discourse Structure and Discourse Force: Brewer (1980)

Brewer classifies texts first by type: description, narration and exposition. He then categorises the force which is related to the purpose of the discourse under four headings: inform, entertain, persuade and literary-aesthetic. A text is classified according to both parameters.

The system is less refined than that of Werlich (1976) in the number of text types identified. Werlich recognised distinctions between

description, narration, exposition, argumentation and instruction; these distinctions appear however to be related to the purpose in Brewer's terms rather than the type.

Wixson (1979) identified qualitative differences in miscue pattern on Narrative and Expository text. If similar differences are to be analysed in cloze responses, a method of classifying texts into 'types' is necessary. Perrera (1982) classified texts along two axes, chronological to non-chronological and personal-impersonal. The subjective element in this system is considerable and it may be that the fluent reader can subjectively categorise texts in terms of their total content. The validity of such subjective assignments will require to be substantiated.

III SUMMARY:

Cloze tests may be used to investigate qualitative differences between normal and failing readers if their reliability and validity are established in quantitative terms. Unless quantitative distinctions between the groups are clear, responses cannot be classified as belonging to a 'Poor' or a 'Good' reader. Cloze tests will require the reader to scan the text, recognise the words of which it is composed and form them into chunks. They will also require the reader to interact with the meaning of the text. They will therefore reflect the major components of the reading process.

The words to be deleted may be classified in terms of grammatical form class, position in sentence, standard frequency, and the distribution of meaning cues in the text. The rate of deletion will not have systematic effects but will depend on the actual words deleted. There

should be as many deletions as possible but the length of the task should be considered in relation to the concentration span of the subjects.

The physical lay-out of the test may affect results; in particular the effect of a physical gap in a text may be different for failing and normal readers. Variation in the size of the gap to convey word length information will also convey form class constraints and may prevent the recording of a response which would have yielded information. The size of the gap should not be so large as to prevent the following context being available in peripheral vision if the reader's eye-movement makes a fixation at a gap.

A variety of scoring systems and a classification of errors should yield qualitative information regarding differences between failing and normal readers. Differences may be related to syntactic or semantic constraints in the text or to their recognition by the reader. Errors may point to failure in a specific component of the reading process as outlined in Chapter 1. Not all errors may be specifically 'reading errors' but may arise from the background knowledge of the reader. In order to analyse results in terms of the interaction between a reader and a text a system of text description is required.

The level of difficulty of the text will affect readers of different ability levels and stages of development differently and comparisons must therefore be made between failing readers and normal readers of equivalent reading age and of equivalent chronological age.

Predicted readability levels may be obtained by the use of a Fry graph. Cloze scores of readers of equivalent reading ages should also be used to establish readability levels. Previous studies which have related cloze scores to other tests of comprehension have applied to verbatim scoring on n^{th} word deletion tests and cannot therefore be applied to any other scoring or deletion system.

Text descriptions may be at the level of the word, proposition, phrase, sentence or discourse. At word level, the concept of redundancy will reflect all the constraints acting on a word. Propositional analysis will reflect the amount and organisation of information in a text. Phrase level analysis will be important in examining the ability of the reader to form the text into appropriate chunks. Sentence level descriptions will reflect the length and structure of individual sentences and the nature of the main verb.

Descriptions of discourse structure and large segments of text take a variety of forms. The systems of cohesion, semantic networks, functions and subjective categorisation of texts according to 'literary types' may all be of use in relating the readers' responses to specific features of the text.

Before undertaking comparisons between failing and normal readers certain preliminary investigations of the performance of failing readers on cloze tests are necessary in order that the design of the comparison test should be reliable and valid.

CHAPTER 3: PRELIMINARY STUDIES

Before a reliable comparison study could be designed it was necessary to investigate the effect of various factors in the presentation and design of cloze tests on the performance of failing readers of the type described in Chapter 1. Three preliminary studies were carried out with groups of the failing readers described in Chapter 1.

'Failing Readers' in this and later sections is the term used to describe the sample drawn from the population described in Chapter 2. The test used to measure reading ages is the Schonell R3 test of Silent Reading Comprehension (Oliver and Boyd 1971) and all 'failing readers' enter Secondary school with a reading age at least two years below their chronological age.

'Intelligence' tests are not administered to all failing readers but Reasoning Quotients obtained in the course of referrals of some of the subjects to the Child Guidance Service are in the range 70 to 85 on the Verbal tests and 70 to 120 on Non-verbal tests. The failing readers are generally in the 'low-average' intelligence range. Boys outnumber girls in the failing reader group by approximately six to four.

Visual discrimination tests show that only five per cent of the group have problems in this area and that these problems are generally confined to the letter groups b-d-p-g-q and m-n-h-u-v. The problem seems to occur on isolated letter discrimination tests more frequently than in normal reading.

Auditory discrimination problems are less frequent and are usually

associated with dialect features such as vowel sounds.

While these factors may have contributed to delay in learning to read they do not appear to be sufficiently severe to inhibit reading at secondary school levels. Isolated word-recognition tests show that vowel digraphs and consonant blends still give problems to the majority of the subjects. On the Burt Vernon word recognition tests reading ages are between eight years and ten years six months on entry to secondary education. Syllabification also presents problems.

In the reading aloud of continuous prose 'sounding out' is the single most common strategy for word attack and is used rigidly by a large percentage of the subjects, approximately 90%. Approximately seventy per cent of the subjects point as they read.

Socio-economic factors do not differentiate the failing readers from other members of the school population. All of the studies reported in this thesis were conducted in one secondary school and its primary 'feeders'. The catchment area includes eight villages originally associated with the mining industry but now serving as dormitories for Edinburgh or Livingston New Town.

Most of the school population lives in rented accommodation, mainly council housing, and is drawn from working class families. Ten per cent of the failing readers belong to families of more than four children; this figure is slightly higher than for the whole school population, approximately seven per cent.

The samples of 'failing readers' for this and later studies were drawn from this population.

I PRELIMINARY STUDY 1

The factors which were investigated in this study were physical lay-out, form class of deletion, rate of deletion and influence of individual texts. Sources of difficulty were also investigated by comparing those items which the subjects found most difficult with those which they found most easy to restore.

i Subjects For this study twenty failing readers, eight girls and twelve boys were used as subjects; one girl did not complete all the tests. N=19

Chronological ages ranged from eleven years ten months to thirteen years six months. Reading ages as measured by the Schonell Test R3 are given in Table 2.

ii Materials Five texts of readability level approximately nine years as measured by a Fry graph were chosen from books used in the remedial department. Sources are listed in Appendix I-1. More than one text was used to minimise idiosyncratic results related to a specific text.

Text length was deliberately varied.

Preparation of texts The basic 'control' form with which all other tests were compared was prepared by deleting every fifth word, marking each deletion by a standard twelve space gap and typing the test in normal spacing in lines the full width of an A4 page. This form of test is called Form A.

Form B: Since later studies would require texts to be presented as a series of separate numbered sentences, Form B was prepared exactly as Form A but with each sentence starting on a new line.

That is, the text was in fact continuous but appeared as a series of separate numbered sentences.

Form C: To investigate the effect of density of print on the page Form C was prepared as Form A but double spaced.

Form D: To investigate the effect of line length, Form D was typed as Form A but with lines only half the length.

Forms B, C and D together would provide evidence regarding physical lay-out.

Form E: To investigate difference between random and rational cloze tests and the effect of form class of deletion, Form E was prepared by deleting only verbs. Not all verbs were deleted and a minimum of four words was left between deletions. Line-length and spacing were as Form A.

Form F: As a comparison to Form E, Form F was prepared by deleting only pronouns and articles. Not all pronouns and articles were deleted; a minimum of four words were left between deletions. Lay-out was as Form A.

In addition to Forms E and F, form-class of deletions was investigated throughout all the forms of the tests.

Form G: Every fourth word was deleted but otherwise the test was as Form A.

Form H: Every seventh word was deleted but otherwise the test was as Form A.

Forms G and H were designed to investigate the differences caused by varying the amount of context betweeen deletions.

All deletions were represented by a standard twelve space gap. By using each of the five texts in each of the eight forms a total of forty cloze tests was created.

Table 3.1 Forms of cloze test used in Study 1

Form	Lay-out	Deletion
A (control)	Normal spacing, full length line	5th word
B	Separate numbered sentences	5th word
C	Double spacing, full length line	5th word
D	Normal spacing, half length line	5th word
E	Normal spacing, full length line	Verbs
F	Normal spacing, full length line	Pronouns and Articles
G	Normal spacing, full length line	4th word
H	Normal spacing, full length line	7th word

iii Presentation Each subject completed one test per day over a period of eight weeks. Order was varied so that each subject encountered each TEXT once a week and completed all forty TESTS; that is practice effect was equalised over texts and forms of text by varying the order of presentation between subjects. Table 3.2 shows the increase in mean score over the eight weeks. Since each Test and each Form had a different number of deletions results have been converted to percentages to enable comparisons to be made. The figures represent the mean score of all subjects over the five tests taken during the week.

Table 3.2 Mean cloze score for each week of the Study

Week Number	1	2	3	4	5	6	7	8
Cloze Score	51.2	52.0	59.9	57.7	63.2	66.2	64.6	64.8

iv Scoring Throughout this study only exact-word scoring, Verbatim system, was used. In all studies spelling errors were ignored. Form class scores were also investigated, see Table 3.7 below. POST-TEST: After all the tests had been completed each subject read aloud all the passages and word-recognition errors were recorded. The comprehension questions, see Appendix I.2, were asked and scores recorded. Table 3.3 shows the total cloze score, number of word recognition errors, comprehension score, all expressed as percentages, and the reading age as measured by the Schonell R3 Silent Reading Test. (Oliver and Boyd, 1971).

v Results

a.Correlation between cloze and other measures

Table 3.3 Comparison between cloze scores and other measures

Pupil Number	Cloze Score	Word Recognition	Comprehension	Reading Age
1	45	6	78	9y0
2	22	19	52	7y9
3	29	3	44	7y6
4	44	6	88	9y5
5	90	1	90	11y4
6	87	1	92	9y5
7	49	6	88	7y9
8	88	1	90	10y3
9	41	9	76	9y5
10	66	2	80	8y2
11	26	5	86	7y11
12	58	4	56	8y7
13	91	0	92	11y4
14	94	0	100	11y4
15	40	3	96	8y7
16	69	1	86	9y9
17	59	10	94	8y7
18	54	6	78	10y3
19	81	1	88	9y9
Mean	59.6	4.4	81.8	9y5
S D	23.0	4.5	14.9	
$r_{c\|x}$	—	0.76	0.65	0.78
Pr		.001	.01	.001

$r_{c|x}$ = value of Spearman's correlation co-efficient between cloze scores and measure in column x.

Spearman's rank-difference correlation method was used to compare cloze and other measures; values and significance levels of this statistic are given at the bottom of Table 3.3. The same statistic was applied to a comparison of word recognition scores and reading ages, (value of r = 0.61,p = 0.01), and comprehension scores and reading ages; (value of r = 0.42, p is not significant).

The small number of word recognition errors implies that demands on attention for decoding had been minimised but the significant correlation between this measure and both cloze and reading age again

point to the fact that decoding does make some contribution to the reading failure of the subjects.

The low correlation between comprehension question scores and reading age suggests that cloze may prove a more valid and reliable indicator of reading comprehension ability than teacher created questions.

b Comparison between results for different texts.

Table 3.4 Comparison between mean scores on different texts

Text Number (n)	1	2	3	4	5	Total
Mean	70.1	58.7	64.4	59.2	51.5	59.6
S D	19.7	22.5	22.2	26.1	27.8	23.0
t_i:n	-	4.42	2.04	3.12	4.47	
Pt		.001	.10	.01	.001	

The mean frequency of correct response for each text is given as a percentage. Frequencies were compared by a t-test between means; values and significance levels of t between the mean for Text 1 and each of the other texts are given in Table 3.4.

c Comparison between results for different forms.

Table 3.5 Comparison between scores on different forms of test

Form (x)	A	B	C	D	E	F	G	H	Total
Mean	58.1	57.9	60.2	57.2	56.2	70.1	55.2	62.8	59.6
S D	23.5	22.8	22.7	23.1	26.1	21.7	24.0	24.9	23.0
t_a:x	-	0	1.23	0.98	1.08	6.03	1.44	2.78	
Pt	-	-	-	-	-	.001	-	.02	

Scores for each subject were totalled over Form A, for all five texts and for each of the other forms. The mean and standard deviation were calculated and a t-test applied between the results for Form A, the control form, and each of the other forms. Values and significance levels of t between means for Form A and each of the other forms are given in Table 3.5.

Table 3.6: Responses to deletions of different form classes

	Form-Class of Word Deleted								
	prep.	art.	pron.	verb	noun	adj.	adv.	conj.	mean
No. of items deleted	58	87	126	138	100	49	49	33	
No. of responses	1102	1653	2394	2622	1900	931	931	627	
Zero responses %	9.8	12.2	10.6	15.8	14.4	20.5	18.4	20.4	15.3
Verbatim Responses %	66.0	67.0	65.0	59.0	59.0	52.0	43.0	50.0	59.6
Correct Form Class %	71.8	74.8	74.6	73.4	69.7	57.0	46.2	57.7	69.0
Preposition	(5.8)	2.4	3.4	1.2	2.0	2.7	3.3	6.3	3.4
Article	2.1	(7.8)	2.2	2.1	1.7	5.4	2.5	3.1	3.4
Pronoun	2.6	2.5	(9.6)	1.7	4.5	2.0	5.7	4.6	4.2
Verb	3.5	2.0	1.9	(14.4)	2.2	2.8	6.5	3.4	4.6
Noun	1.7	1.7	1.1	1.8	(10.7)	4.0	1.8	2.5	3.2
Adjective	0.9	0.6	0.8	0.6	2.2	(5.0)	4.2	0.6	1.9
Adverb	1.4	1.0	0.5	1.0	0.8	2.0	(3.2)	1.4	1.4
Conjunction	6.2	2.8	4.9	2.4	2.5	3.6	11.4	(7.7)	5.2

All deletions were described in terms of the grammatical form classes listed at the top of Table 3.6. The number of items of each class was counted and the total number of responses for each class was calculated.

The number of zero responses, that is occasions on which no entry had been made, was counted. The numbers of verbatim, that is exact-word, responses and of responses of correct form-class were counted. The remaining responses, those of incorrect form-class, were analysed to give the percentage of actual responses to deletions of one form-class which belonged to another form-class. Thus, 2.1 per cent of actual responses to deletions of the form-class of prepositions were, in fact, articles. The figures in brackets give the percentage of responses which were correct in form-class but wrong in meaning.

The final column gives the totals over all deletions.

d Variation in error rate with length of task

Table 3.7: Increase in error rate with number of items

Ordinal position of item	1	2	3	4	5	6	7	8	9	10
Mean % error	22	27	33	29	37	41	40	52	45	44

Ordinal position of item	11	12	13	14	15	16	17	18	19	20
Mean % error	42	48	42	40	37	51	58	54	49	49

Since some tests involved the subjects in completing significantly more items than others, this factor was investigated. Table 3.7 shows the total number of incorrect responses to all items in terms of their ordinal position in the tests. The rate of error was seen to increase from twenty-two per cent on first items to fifty-two per cent on eighth items and fifty-eight per cent on seventeenth items. The rate of increase was not regular.

e Other significant results

i Gaps at ends of lines increased the error rate from its overall mean of forty per cent to fifty-three per cent. The number of responses on which this figure is based is 1805; the number of items is 95.

ii First words of sentences increased the error rate from forty per cent to fifty-six per cent. The number of items on which this figure is based is sixty-two, the number of responses 1178. No other position in the sentence was found to influence the error rate.

Discussion of Results

a Differences between texts

The results show that differences between texts gave rise to greater variation in scores than did differences between forms of test. Several factors may have contributed to this effect.

The length of the texts varied from fifty-one to a hundred and one words. The results given in Table 3.7 would indicate that longer texts would produce more errors, proportionately, than short ones.

This effect may be related either to the concentration span of the subjects, (see above), or to the increasing confusion caused by errors earlier in the test.

The actual nature and structure of the text may have created specific difficulties. Since such difficulties are to be a focus of the comparison study the other possible cause, task length, requires to be studied further or controlled.

b Differences between forms in physical layout

Spacing and line-length made no significant difference to the overall results for the group although there were some indications that a few subjects were affected by these factors. The presentation of the text as separate numbered sentences, Form B, did not significantly affect results.

Despite these results, there is an indication that faulty scanning may affect performance on cloze tests in the increase in error for gaps at ends of lines.

Raban (1982) has investigated the influence of line breaks at various positions in the sentence on children up to the age of eight and has shown that the effect of line break varies with position of word in sentence and phrase and with particular grammatical form classes. The deletion of a word from a line end will thus have a variable effect which will interact with those of form class and position in sentence. It would therefore appear necessary to avoid gaps at ends of lines in cloze tests for use with readers at this level of ability.

c Form-class of deletion

As had been anticipated from the work of Fillenbaum (1963) and others, grammatical form class of deletion contributed significantly to variation in performance.

Table 3.6 shows that form-classes which have a restricted lexicon produce a higher percentage of Verbatim responses than classes of wider lexicon. There is also a variation in syntactic difficulty reflected in form class score.

The classes of preposition, article and pronoun are both syntactically and semantically easier to restore. Those of verb and noun are syntactically simple but semantically more difficult while those of adverb, adjective and conjunction are both syntactically and semantically difficult.

Since it has been argued that these readers have a general difficulty with language structures, (Killey and Willows, 1981) observations of 'comprehension' would be distorted by the variation in purely syntactic constraint between deletions. The categories of adverb, adjective and conjunction might produce a more significant variation in the performance of failing than of normal readers. These form classes will not therefore be deleted in comparison studies involving normal and failing readers.

The categories of preposition, article and pronoun produce fewer errors than other classes and would therefore not yield as much evidence of a qualitative nature. The categories of Verbs and Nouns will produce errors at approximately the same rate as random deletion, see Table 3.6, and should therefore produce reliable as well as valid comparisons between normal and faling readers.

d Deletion rate

Increasing the deletion rate from fifth to fourth word, Table 3.5, Form G, did not significantly affect performance. This would suggest that the readers are 'chunking' adequately up to five word fragments.

Lowering the deletion rate, Form H, produced a significant improvement in performance. There is however an interaction between deletion rate and form-class of words deleted. Table 3.8 compares the frequency of occurrence of deletions of specific form-classes in Form H with their occurrence in Form A.

Table 3.8: Form class of deletions on Form H compared to Form A

% deletions which are	prep.	conj.	art.	pron.	noun	verb	adj.	adv.
Form H	14	9	12	11	20	18	7	9
Form A	13	9	13	15	23	13	6	9

The table shows that no more of the deletions in Form A appear to belong to the difficult classes of adjective, adverb and conjunction than do those in Form H, but that more deletions belong to the easy classes, preposition, pronoun and article, in Form A.

A further factor which must be taken into account in deciding on deletion rate is the interaction between successive deletions. If two words are deleted from the same sentence and the first is incorrectly restored, the second would seem to be more difficult to restore. McKenna (1978) has made a general study of the cumulative effect of incorrect cloze responses and found the effect to be significant overall but not in every case.

In the present study interactions between deletion within sentences varied considerable between From A and Form H.

Table 3.9: Interaction of deletions within sentences

	number of items involved in sentences with 'n' deletions				
'n'	1	2	3	4	5
Form A	6	36	24	8	5
Form H	14	36	6	-	-

A study of the nine deletions which were common to the two forms shows that the effect of this interaction is not a simple one. Table 3.10 shows the number of correct responses to each of these nine deletions in Form A and in Form H. It also shows the number of words deleted from the sentences involved in each form.

Table 3.10: Number of correct responses to 9 deletions common to Form A and Form H

	Form	Item 1.7	2.7	2.14	3.7	3.14	4.7	5.7	5.14	5.21	
Frequency of correct response	A	8	6	12	16	18	11	11	7	9	98
	H	15	4	12	15	14	14	8	8	9	99
No. of deletions in sentence	A	3	2	3	1	5	2	1	1	3	
	H	2	2	2	1	3	2	1	1	2	

These results illustrate the difficulties of interaction between many factors in the creation of cloze tests. The interaction within sentences was further analysed by examining those pairs of deletions within a single sentence which were common on both Forms A and H. The items were totalled under four headings; the number of subjects restoring both correctly, the number restoring both wrongly, the number restoring the first but not the second and the number restoring the first wrongly but the second correctly.

Table 3.11: Interactions of deletions within sentences containing two deletions

	Number of occasions on which subject restored			
	Both correctly	Both incorrectly	1st gap incorrect only	2nd gap incorrect only
Form A	165	79	57	41
Form H	164	74	66	38

These results would indicate that the second deletion in a sentence is slightly easier to restore than the first and that failure to restore the first of a pair of deletions is associated with failure to restore the second on approximately fifty per cent of occasions.

If a reasonable rate of deletion is to be achieved it is necessary to delete more than one word per sentence and this interaction must therefore be studied in the results of any study.

e ANALYSIS OF ERRORS

The responses of the ten subjects who scored in the average range for the group were studied in detail. To avoid the effect of task length only the first ten items of each text were analysed; only Forms A, B, C and D of each text were used. There were thus forty responses to each deletion, four from each pupil. The items were arranged in rank order of difficulty, the item which occasioned fewest errors coming first and being designated 'easiest'.

The items were then grouped in tens from the easiest to the most difficult, giving five groups. Means for each group of ten items over the forty responses were used as the basis of the following comparisons.

i **Cueing range** For each of the fifty items a count was made of how far forward or back in the text the reader would have to search for definite and specific cues.

The first cues were those of Form-class. All except six of the items had their form-class cued within a five word segment from the deletion. Two of the remaining six had no cues as to form class. The reason for the high number of responses of correct form-class, see Table 3.6 above, may be the very local nature of the cues. If the readers are dealing with five word 'chunks' of text, all the necessary information regarding form class will be processed in one chunk so that no holding over of information from previous chunks would be required.

Word form cues, eg to singular or plural form or verb tense, were irrelevant in twenty of the items which had only one form, articles, prepositions and pronouns. Of the remaining thirty, all except nine had their form cued within a five word segment. Six of the remaining nine had no cues to form in the text. This factor was not related to ease or difficulty of restoration; six of the ten most difficult words exist in only one form.

Cues to meaning required a much wider cue range. The difference in range of meaning cues was reflected in the percentage of errors.

There were more errors of meaning throughout than errors of word form or form class.

Table 3.12: Comparisions of ten most difficult and ten least difficult items

Percentage of errors which are	in 'Easiest' Ten	in 'Hardest' Ten
Zero responses	27	28
Errors of Form Class	39	22
Errors of Word Form	55	40
Errors of Meaning	58	48
Total number of errors for Ten Items	52	327

Total is over 100 as some errors are incorrect in more than one respect

The larger range of cueing for meaning had two effects. Within the cue range, other words had been deleted. The interaction within sentences between pairs of deletions discussed above was found to be more pronounced in its effect in the ten most difficult items. The number of words missing from the cue range for each item was counted and the mean for each group of ten items calculated. This figure is given in Table 3.13 under the heading WMCR - Words Missing from Cue Range.

Table 3.13: Words missing from the cue ranges of meaning cues

Difficulty level	Number of items with no cues	Distance of cue from deletion in words				WMCR
		backwards		forwards		
		total	mean	total	mean	
Least Difficult	0	41	4	10	1	0.4
Second	0	34	3	26	3	0.5
Third	1	61	6	17	2	1.5
Fourth	1	51	5	41	4	1.5
Most Difficult	2	26	3	41	4	1.3

WMCR = mean number of deletions within the range of text containing cues to meaning

The second effect of longer cue range is related to the chunking of information; the easiest ten items had their meaning cues within the five word segment. More difficult items required information to be carried over from previous chunks or required information from later parts of the text. 'Backwards' distance refers to cues which came before the deletion; 'forwards' distance refers to those which came after the deletion. More difficult items required the subjects to scan ahead of the deletion. The final factor distinguishing the ten most difficult items from the ten easiest is the presence in the difficult group of two words which have no explicit cues to meaning in the text. This forces the reader to make inferences based upon what Barthes (1980) would describe as 'indices', the level at which the atmosphere of the narrative required to be appreciated. In Text 1, 'Suddenly - there was a loud shout - - ' is more an indicator of atmosphere than a conveyor of information.

This table provides additional evidence that the difficulties of this group of readers contain an element which is connected with meaning structures rather than either syntax or decoding: although both of these factors contribute to their difficulties, they do not fully explain them.

ii Text frequency Text frequency is the number of times a word appears in the text. For the purposes of this comparison text frequency was taken over the whole text and not just the fragment which contained the first ten deletions. The mean text frequency for each group of items was calculated and proved the best single correlate of difficulty. Mean text frequency for each group was 2.7 for the easiest ten,- 2.4, 2.0, 1.9 for intermediate groups in rank order - and 1.6 for the most difficult.

iii Position of word in sentence. Apart from the first word being more difficult, no other position in the sentence was found to affect results significantly.

Length of sentence was found to be relevant to difficulty. The mean sentence length for each group of ten items was as follows; for the easiest group, 11.7, the second, 10.9, the third, 11.0, the fourth, 13.2 and the most difficult 15.2 words. This factor must be viewed in relation to the interaction of deletions discussed above.

vii CONCLUSIONS

1 The use of different texts as the basis for cloze tests causes more variation in performance than the deletion of different words within the same text. Comparisons between cloze results should therefore be based on the use of the same text or texts.

2 The physical lay-out of the text does not significantly effect the performance of failing readers except that deletions at ends of lines give rise to an increase in errors.

3 Error increases as the subject proceeds through the test. Later studies should check for the effect of this factor.

4 There is some contribution from decoding in the difficulties experienced by the subjects. Texts used should reflect their own vocabulary and use words of high standard frequency in order to minimise this effect.

5 Deletion rate may affect scores either by altering the words deleted, or by altering the amount of undeleted context around a deletion, or by reducing the size of the task.

6 The influence of the grammatical form class of a deletion affects both syntactic and semantic constraints. Adverbs, adjectives and conjunctions are difficult both syntactically and semantically; pronouns, prepositions and articles are relatively easy to restore both in terms of syntax and semantics possibly because of their restricted lexicon. Nouns and verbs are syntactically well constrained but semantically give frequencies of correct response which are approximately equivalent to the frequency of correct response over random deletions.

7 There is an interaction between successive deletions. Failure to restore the first deletion in a sentence will produce difficulty in restoring later deletions in the sentence on approximately fifty per cent of occasions.

8 Cues to grammatical form class and to word form are generally to be found within five words of the deletion and this size of segment may form the basis of the 'chunking' of text by this group of readers. Cues for meaning, coming from wider ranges, are harder for them to process.

9. The frequency with which a word appears in the text affects ease of restoration.

10 The first word in the sentence is more difficult to restore than any other.

Since most of the texts used in this study were narrative it was necessary to carry out an investigation into how far tests of other literary types would affect performance. This is reported in the next section.

II PRELIMINARY STUDY 2

The factors investigated in this study were the effects of deleting only nouns and verbs and the effects of different types of text.

i Text types The various methods of classifying texts into literary 'types', discussed in chapter 2 Section II,vi,d, having been considered, it was decided to use four categories in the present study.

The DESCRIPTIVE category was retained but it proved difficult to find passages of pure, static description. The category of NARRATIVE was restricted to texts which would have been assigned by Brewer to that of NARRATIVE-ENTERTAIN. The Narrative-informative category was divided into INSTRUCTIONS and INFORMATIVE TEXTS.

ii Subjects N = 16 Five girls and eleven boys from the group of failing readers described above took part in this study.

iii Materials Three texts of each of the four types defined above were selected. Sources are given in Appendix I 3.

iv Deletions Because of the findings of Preliminary Study 1 above, regarding length of task, only ten items were deleted from each text. Two forms of each text were created by deleting ten NOUNS from

one and ten VERBS from the other. There were thus twenty-four tests.

Deletions were marked by a standard twelve space gap.

v **Presentation** One form of each text, noun deleted or verb deleted, was placed in a twelve page booklet. Selection and order of tests was varied so that each subject encountered the tests in a different order. When a subject had completed one twelve page booklet he was given a booklet containing the other twelve tests. That is, each subject completed all twenty four tests.

Each booklet contained six noun-deleted and six verb-deleted tests.

Time was not restricted; subjects were allowed to take as long as they liked but were encouraged to finish one test before going on to another.

vi **Scoring** The twenty-four tests contained a total of 240 deletions, 120 nouns and 120 verbs. In each group of three tests, Narrative, Descriptive, Informative and Instructional, there were thirty noun and thirty verb deletions, making a total possible score of sixty for each group of tests.

Three scoring systems were used: Verbatim scoring in which only the exact-word deleted is scored correct and semantically-acceptable scoring in which any word which restores the author's meaning is scored as correct; acceptable alternatives were decided by the pooled judgement of a group of teachers of English. This system is referred to as SEMAC scoring. Form class scoring in which any word of the same grammatical form class as the word deleted is scored as correct was also used.

Table 3.14: Mean Scores for texts of different types

Scoring System	Group of texts												Total for all texts		
	Narrative			Descriptive			Informative			Instructional					
Form class of deletion	N	V	E	N	V	E	N	V	E	N	V	E	N	V	E
Verbatim															
Mean	11.9	7.2	19.1	10.6	8.3	18.9	13.1	9.6	22.6	6.4	7.4	13.8	42.0	32.5	74.5
SD	4.7	3.6	8.0	4.1	3.8	7.3	3.2	4.8	6.0	3.4	5.2	8.4	13.0	15.6	27.9
*t		5.6			2.6			3.4			1.1			5.2	
sig level		.001			.02			.01			NS			.001	
Form Class															
Mean	26.5	26.3	52.8	24.9	23.8	48.7	23.4	21.9	45.4	20.9	18.9	39.8	95.8	90.9	186.7
SD	3.1	2.7	5.6	4.2	4.5	8.2	3.1	3.4	5.3	4.4	5.1	9.2	12.2	13.4	25.4
*t		0			1.4			1.0			2.9			5.2	
sig level		NS			NS			NS			.02			.001	
SEMAC															
Mean	20.5	16.9	37.4	16.8	14.2	30.9	18.2	13.6	31.8	13.2	12.3	25.5	68.6	56.8	125.6
SD	5.6	4.7	9.8	5.4	5.5	10.5	4.0	5.9	8.9	5.8	6.3	11.7	11.5	20.1	38.2
*t		3.3			3.8			3.2			1.5			8.5	
sig level		.01			.01			0.1			NS			.001	

t = value of t between means for Nouns and for Verbs

Table 3.14a: values of t between means for different groups of texts

	value of t between mean of group in Column 1 and											
	Narrative			Informative			Descriptive			Instructional		
Scoring System	V	S	FC	V	S	FC	V	S	FC	V	S	FC
				xx	xx	xxx			xx		xxx	xxx
Narrative	--	--	--	3.2	3.9	6.4	0	2.4	3.1	2.5	4.8	7.3
	xx	xx	xxx				xx		xx	xxx	xxx	x
Informative	3.2	3.9	6.4	--	--	--	3.8	0.8	3.1	6.6	4.5	2.8
			xx	xx		xx				xx	xx	xxx
Descriptive	0	2.4	3.1	3.8	0.8	3.1	--	--	--	5.1	3.5	6.0
		xxx	xxx	xxx	xxx	x	xx	xx	xxx			
Instructional	2.5	4.8	7.3	6.6	4.5	2.8	5.1	3.5	6.0	--	--	--

p = .001 xxx p = .01 xx p = .02 x

vii Results. In order to check whether the significant differences shown in Table 3.14 were the result of differences between the specific types of text on which the study was based or of some other effect, random groups of tests were created. Each group contained three texts of different literary types. Since the most significant values of t had been obtained under the form-class scoring system this system was used to compare the 'random groups' of tests. Table 3.15 shows that there was no significant difference between the mean scores for random groups of tests. Breaking up the type-groups had removed the cause of the significant difference shown in Table 3.14.

Table 3.15: Form Class scores for random groups of texts

	Group 1	Group 2	Group 3	Group 4
Mean	48.0	46.4	46.6	46.3
SD	7.2	6.4	7.8	5.9
t		0.9	0.5	0.7
sig level		NS	NS	NS

t = value of t between mean for group 1 and other group

Noun and verb deletions also produced significant differences in score under the two scoring systems which take account of semantic information, Verbatim and SEMAC systems, but not under the Form-class systems except on Instructional texts; the total effect under the Form-class system was significant over the four groups of texts. Significant differences between nouns and verbs on form-class scoring show up only over a large number of items.

Different scoring systems gave rise to different values of t as well as to different mean scores. The much higher values under SEMAC scoring suggest that it may give a truer picture of a child's ability to comprehend a test than the Verbatim system. The

restricted lexicon of the subjects may cause them to achieve higher scores under the SEMAC system.

Form class scoring shows a much higher degree of success than either of the other two systems. This again indicates the semantic element in the failure of these children at a level higher than that of the word. It is therefore apparent that all three scoring systems contribute to the information gained and should be retained for any future study.

viii Conclusions

1. The categories of text used in this study affect the performance of failing readers differently.

   The subjective categories used have been shown to be discrete and identifiable. Distinctions between Narrative and Descriptive texts are apparent only under Form class scoring and will therefore yield less information than the distinction between Narrative and Informative which is significant under all three scoring systems.

   Instructional texts present a greater degree of difficulty than the other three types.

   For these reasons, future studies should make use of Narrative and Informative texts as defined in this section.

2 Each of the three scoring systems yields information of a different nature regarding the performance of the subjects. All

three systems should be retained.

3 There is a significant difference in performance on Noun and on Verb deletions. This shows up more clearly on semantic and verbatim scoring than on form class and is therefore not purely syntactic. The difference varies with text type and this must indicate an influence from different semantic structures within the texts of different types.

III PRELIMINARY STUDY 3

This study was designed to investigate a method which might be used in future studies in order to gain information on the effect of the physical presence of a gap in the text and on the use of information from byond the sentence.

i Subjects Twenty-one failing readers, as defined in Chapter 1 and at the beginning of Chapter 3 took part in this study.

ii Materials One text, Appendix I.4, was used throughout. The readability level as measured by a Fry graph was 9 to 10 years and the subject matter was within the existing range of knowledge of the subjects, Scottish children living in a rural environment.

The text was typed continuously with every fifth word deleted to give a 'random' cloze test. This will be referred to as 'Continuous Presentation' of the text. The subjects could see the

whole text as they worked.

The text was also typed as series of separate sentences, each one being numbered and starting on a new line. The order of the sentences was varied so that each subject met them in a different order. Preliminary Study 1, above, had shown that simply presenting the text in this way -as a series of separate numbered sentences - in the correct order and with the whole text visible had no significant effect on the performance of the group as a whole. Any significant effect found in the present experiment could not be attributed to simple differences in lay-out. This type of test will be referred to as 'Isolated Sentence Presentation' of the text.

A card screen was designed so that only one sentence of the isolated sentence test could be seen at a time. The test was inserted by the tester so that the first sentence showed through a slit in the card. The subject could move the test by pulling a strip of card which was attached to the bottom. The test could be moved in only one direction so that the subject could not return to a sentence after moving on. The screen was long enough to conceal the whole test in all the necessary sentence positions. By this method, the subjects were restricted to working on one sentence at a time in the order in which the tester had placed them.

For both continuous and isolated sentence presentations of the test, two versions were typed. Form A had no gaps left to mark the position of the deletions. There was no physical indication that words had been left out. Form B had a standard twelve space gap to

mark the position of each deletion, see Appendix I.4.

iii Method The subjects completed all four tests as follows.

Test 1: Isolated sentence presentation without gaps. Followed after a three day interval by

Test 2: Isolated sentence presentation with gaps. This was followed after a four week interval by

Test 3: Continuous presentation without gaps. Followed after a three day interval by

Test 4: Continuous presentation with gaps. The tests were arranged in this order so that the amount of information available to the subjects increased as they proceeded through the series of tests.

iv Scoring systems

Location Score:

On those forms which had no gaps the subjects were required to mark with a vertical line the position from which a word had been deleted; they were required to LOCATE the deletions. The number of correctly positioned lines, ie those which coincided with the position of actual deletions, gave the LOCATION, L, score. Provision was made for checking that the subjects had not recognised the fifth word deletion pattern. Errors were of two types; first lines were inserted where no deletion had been made, second no insertion was made at the site of a deletion. By counting the number of words between the lines inserted by each subject, it was possible to see that none of them had in fact followed a fifth word pattern.

Verbatim Scores

On the tests with gaps only the exact word deleted was accepted as correct. This is referred to as the VERBATIM scoring system.

On the Location test subjects were asked to write in at the top of each vertical line which they had inserted the word which had been deleted from that position.

There were therefore three types of score:

1 Verbatim score on cloze test with gaps: Tests 2 and 4

2 Location scores on tests without gaps: Tests 1 and 3

3 Verbatim score on tests without gaps: Tests 1 and 3

Each of these scores was available for both ISOLATED SENTENCE and CONTINUOUS PRESENTATIONS of the texts.

Spelling errors were disregarded.

Extrapolation

Since no subject identified all the deletion positions on the tests without gaps, the possible score for this test under the Verbatim system varied from subject to subject. On the test with the gaps the total possible was twenty-seven for all subjects. To enable comparisons to be made between the two sets of Verbatim scores, an extrapolation was made.

The Verbatim score obtained on the location test, Tests 1 and 3,was divided by the Location score on the same test and the result multiplied by twenty-seven. This provided some indication of the score which the subject would have achieved had he identified all the deletion positions on Tests 1 and 3.

Table 3.16: Mean scores on different tests

	Scoring System						
	Location		Verbatim				Extrapolation
Presentation	C	IS	C	IS	C	IS	--
Test Number	3	1	3	1	4	2	--
Mean	14.1	16.9	6.0	7.0	9.6	10.2	10.5
SD	4.2	3.9	3.1	3.0	3.9	3.6	4.1
t		5.1		2.5		1.1	
sig level		.001		.01		NS	

C = Continuous presentation
IS = Isolated Sentence presentation
t = value of t between means on Isolated Sentence and Continuous presentations

v Item Analysis

The frequency of correct response to each item under each scoring system was calculated.

An extrapolation similar to that for scores was calculated for frequencies.

Since there were twenty-one subjects, the calculation was made by dividing the frequency of correct response under the Verbatim system on Tests 1 and 3 by the frequency of correct locations of each item and multiplying the result by twenty-one. The result indicates the number of subjects who would have been likely to supply the correct verbatim response to the item if all the subjects had located it correctly.

Table 3.17: Frequency of correct response to individual items

	Scoring System						
	Location		Verbatim				Extrapolation
Presentation	C	IS	C	IS	C	IS	--
Item Number	Test 3	1	3	1	4	2	--
1	8	8	1	1	4	4	3
2	16	15	15	15	15	18	20
3	20	17	0	0	1	0	0
4	16	16	6	1	9	7	8
5	5	17	0	0	1	0	0
6	18	20	5	10	11	10	6
7	19	18	1	0	1	0	1
8	12	14	4	6	9	6	8
9	1	0	0	0	0	0	0
10	8	16	2	1	6	3	5
11	14	16	13	16	19	19	21
12	12	16	10	13	14	16	19
13	6	12	2	2	5	3	7
14	0	0	0	0	0	0	0
15	15	17	7	9	10	12	10
16	11	14	8	9	14	17	15
17	10	14	5	2	4	6	10
18	3	3	0	0	2	6	0
19	14	19	5	3	9	7	6
20	14	15	0	0	0	0	0
21	0	2	0	0	2	5	0
22	15	20	13	20	18	19	18
23	6	7	1	3	4	9	4
24	16	19	4	5	5	4	5
25	14	7	0	0	4	3	0
26	12	14	11	14	16	16	19
27	12	19	12	16	19	20	21

vi Treatment of results

a SCORES These were compared by t-tests between means and by Pearson's Product-moment Co-efficient of Correlation, see Tables 3.16 and 3.18.

Table 3.18: Pearson product moment correlation co-efficients

Test Number	1a	1b	2b	3a	3b	4b
1a	-	.74	.66	.77	--	--
1b	.74	--	.85	--	.83	--
2b	.66	.85	--	--	--	.83
3a	.77	--	--	--	.86	.69
3b	--	.83	--	.86	--	.83
4b	--	--	.83	.69	.83	--

All values are significant at the .01 level
a = location Score b = Verbatim Score

b FREQUENCIES These were compared by the use of a four cell pass-fail contingency table (see Guilford and Fruchter, 1978, p207) between different scoring systems and between continuous and isolated sentence presentation under each scoring system. Only those items which gave significant values of chi-square are listed in Table 3.19.

Table 3.19: Values of chi-square

	Value of Chi-square between Scoring Systems		Presentations (Continuous/Isolated sentence)		
	Location v Verbatim	Verbatim	Location	Verbatim	
Test Nos.	3 and 4	3 and 4	1 and 3	1 + 3	2 + 4
Item No.					
3 These	20.0xxx	0	0	0	0
4 the	5.5x	1.0	0	5.0	0.5
5 twenty	4.0	1.0	9.0xx	0	1.0
6 twice	5.5x	6.0x	2.0	4.0	0.2
7 morning	18.0xxx	1.0	0.2	1.0	1.0
10 stable	1.0	2.7	6.4x	0.3	1.3
17 ducks	6.0x	1.0	1.6	4.0	0.3
20 anyone	14.0xxx	0	0.2	0	0
22 to	1.0	2.7	5.0	7.0xxx	0.2
24 farmyard	11.0xxx	1.0	4.0	0.1	1.0
25 their	6.3x	4.0	5.4x	0	1.0
27 the	7.0xxx	7.0xxx	7.4xx	2.0	1.0

x = .02 xx = .01 xxx = .001

Items were then grouped according to grammatical form class and the mean frequency of correct response to each form class was calculated.

Table 3.20: Mean frequency of correct response according to form class of item deleted

Scoring system	Location		Verbatim	
Presentation	Cont	Isolated sentence	Cont	Isolated sentence
Verb	12.0	16.3	10.7	9.7
Preposition	8.0	9.3	7.3	7.7
Adverb	10.0	12.0	9.7	10.3
Conjunction	11	14	14	17
Article	14.5	16.5	15.5	16.0
Noun	11.4	14.7	4.7	6.9
Noun-determiner	12.7	13.7	2.0	1.0
Adjective	1.5	1.5	1.0	3.0
Pronoun	14	15	0	0

vii Discussion of results.

a Effect of physical presence of a gap in the text

A comparison of the extrapolation with Verbatim scores on tests with gaps would indicate that the physical presence of a gap in the text does not of itself inhibit the performance of these subjects. The extrapolated scores from the location task are very close to the Verbatim scores on the normal cloze tests.

On the frequency count the extrapolation differed from the verbatim frequency on the cloze test by less that two points on average and by over three points on only five items. Chi-square between verbatim scores on location and cloze tests reached significance levels on only two items.

It would appear that it is not the physical presence of a gap which prevents failing readers from making use of following context (Neville and Pugh 1977) but there remains the possibility that the syntactic disruption caused by the deletion of a word causes them to pause, even when the deletion is not signalled in any other way than by the disruption of syntax.

b Use of syntactic information.

Location scores may be seen as reflecting two elements in the reading process; visual scanning and recognition of local structure.

The drop in location score from isolated sentence to continuous presentation is ascribed to increased difficulty of visual scanning in the presence of a large body of text. It is significant that the change in scores is not due to an overall

effect but to several items individually being easier to locate on the isolated sentence than on the continuous presentation.

The structural element in location scores is reflected in two ways. Firstly, the contrast between the high location scores and the much lower verbatim scores indicates a degree of dificulty being introduced by the semantic processing required for the verbatim restoration of a word. In order to locate the position of a missing word, it is necessary only to recognise the syntactic structure of which it forms a part. In order to restore it, it is necessary to process meaning.

Secondly the syntactic element in location scores is reflected in Table 3.20. This shows the class of adjectives, which has a greater degree of structural redundancy than other form classes as being more difficult to locate.

The evidence concerning the lack of effect of a physical gap would also suggest sensitivity to syntactic structures.

c Use of semantic information

The lack of significant difference between verbatim scores on Isolated sentence and Continuous presentations would indicate that the subjects relied on within sentence information for semantic as well as syntactic processing.

This is also apparent in the item analysis and the values of chi-square between isolated sentence and continuous presentations. There

is little indication of any of the subjects making use of information from beyond the sentence on this test.

viii Conclusions

1 The physical presence of a gap in the text did not adversely affect the performance of this group of failing readers.

2 The ability of the group to recognise the position from which a word had been deleted was greater than their ability to restore the deleted word.

3 The degree of difference between these two abilities was related to the grammatical form class of the word deleted.

4 The difference may be seen as reflecting the relative importance of local cues and cues from beyond the sentence in restoring the item. 'Beyond the sentence' includes the reader's background knowledge as well as other sentences in the text.

5 Nouns and pronouns appear to be more affected by the lack of use of information from beyond the sentence than verbs.

6 This group of failing readers made little use of information from beyond the sentence in restoring the exact words deleted in this test.

IV SUMMARY OF PRELIMINARY STUDIES

Three preliminary studies were carried out to produce a design for a study in which the performance of failing readers would be compared with that of normal readers.

Study 1 considered the effects of specific texts, physical lay-out, form-class of deletion and deletion rate.

The differences between scores on the five texts used placed them in the same rank order over a series of different deletion systems. Factors specific to individual texts will therefore make it necessary to base tests on the same texts if results are to be valid.

Physical lay-out in terms of line length and spacing did not affect performance. Gaps at ends of lines lead to an increase in error. Since the use of information from beyond the sentence was to be a focus for the later study it was necessary to investigate the effect of presenting the passage as a series of separate numbered sentences while retaining the text in its continuous form. This change in lay-out had no significant effect.

Form-class of deletion was shown to affect cloze scores and to involve changes in syntactic and semantic constraints. Adjectives and adverbs with conjunctions proved difficult in terms of both syntax and semantics: articles, prepositions and pronouns proved easy. The latter result is thought to be related to the restricted lexicon of these word classes. Nouns and Verbs gave a mean frequency of correct response approximately equal to random fifth word deletion. They were syntactically easy to restore, ie tended to produce responses of the correct form class, but semantically intermediate between the 'Easy' and 'Difficult' groups. For this reason it was decided that deletion of nouns and verbs would yield more information than random deletion on qualitative aspects of performance while retaining quantitative reliability.

A change from fifth to fourth word deletion produced no significant effect but a change to seventh word deletion lead to

a significant increase in score. This effect may be attributed either to the increased amount of context between deletions or to a change in the words deleted or to a decrease in the length of the task. It may be related to the interaction between deletions within sentences which was shown to exist.

Word recognition errors on reading the same texts aloud indicated that decoding skill was positively correlated with cloze ability.

The ten deletions which proved most difficult were compared with the ten which proved most easy to restore. The following factors were found to be associated with cloze difficulty:

a the distance of cues from the deletion. It was found that while syntactic cues were usually to be found within five words of the deletion, semantic cues tended to require a longer segment of text to be used. The difficult words had tended to have longer range semantic cues than the easy ones so that there was an interference from other deletions within the range.

b text frequency: The number of times a word appeared elsewhere in the text was directly related to ease of restoration.

c sentence length, in words, was directly related to difficulty of restoration.

d The first word in a sentence was more difficult to restore than any other.

The second study investigated a method of classifying texts according to discourse 'type' and found that significant differences in score were produced by texts of four different types when presented in

groups of three with nouns or verbs deleted. Random groups of three texts from the same set of twelve texts did not produce significantly different scores.

The types used were Narrative, Descriptive, Informative and Instructional. Instructional texts produced a greater degree of difficulty than the other three types. Distinctions between Narrative and Descriptive texts were apparent only under the Form-Class scoring system which accepts as correct any word of the same form-class as the word deleted. Narrative and Informative texts gave significantly different scores under Verbatim, Semantically acceptable and Form class systems; it was therefore decided to use Narrative and Informative texts in future studies.

It was also decided that as the three scoring systems yielded different types of information they should be retained.

Differences between tests with nouns deleted and those with verbs deleted were significant under Verbatim and semantically-acceptable scoring systems but not under the form-class system. Deletions of words from both classes may therefore yield more information than deletion of words from either class on its own.

Study 3 was concerned with developing a method for use in future studies and with investigating the effect of a physical gap in the text.

It was concluded that it was not the physical gap which prevented the subjects from making use of following context but that syntactic disruption may have a significantly greater effect on poor than on good readers.

The difference between the ability to locate a deletion and the ability to restore it varied with the form-class of the deletion. The information gained from the LOCATION process was sufficiently important for the test to be included in the final study, described in Chapters 4 to 6. LOCATION is the term used for the task in which the subject is required to indicate by a vertical line the position in the text from which a deletion has been made.

The texts were presented as a series of ISOLATED SENTENCES in random order and then as a CONTINUOUS text. The difference in presentation affected the LOCATION TASK but not the CLOZE TASK when Verbatim scoring was used. Location scores were higher on isolated sentence presentation than on continuous presentation.

From these three studies the design and hypotheses for a study comparing failing and normal readers evolved. This comparison study is reported in the next three sections.

CHAPTER 4: A COMPARISON OF THE PERFORMANCE OF FAILING READERS AT AGE TWELVE WITH NORMAL READERS OF EQUIVALENT CHRONOLOGICAL AGE AND OF EQUIVALENT READING AGE

On the basis of the previous research discussed in Chapters 1 and 2 and of the preliminary studies described in Chapter 3, it was possible to identify areas in which the performance of failing readers might differ from that of more skilled readers. These differences might arise in visual scanning, word recognition, chunking or the use of syntactic and semantic information from different parts of the text.

Because of the necessity of using the same text throughout, it was decided to compare the failing readers with normal readers of equivalent reading age in order that the level of difficulty of the texts used should be equivalent in its effect. Since the Schonell test had shown reading ages to be around nine years, on average, a comparison with normal nine-year olds was carried out.

It is however equally important to compare the failing readers with readers of similar chronological age because of other possible differences between nine and twelve year olds. Twelve year olds, for instance, might be expected to have more general, background, knowledge than nine year olds.

The three group comparison would enable both qualitative and quantitative differences to be investigated. That is, the study was designed to examine the nature of reading failure; the failure may be a general late-development, in which case the

responses of the failing readers and those of the nine year olds should be the same, or it may be the result of different reading behaviour, in which case the failing readers' responses should be different from those of the nine-year-olds and the nine year olds should be seen to be developing towards the same reading behaviour as normal twelve year olds.

I HYPOTHESES

The following specific hypotheses, formed on the basis of the arguments of Chapter 1 and the studies reported in Chapter 3, were to be investigated.

There will be differences of performance on cloze tests betweeen the three groups of readers, failing readers, nine year olds and twelve year olds with regard to the following factors:

1 Differences in score between normal and failing readers will be greater under scoring systems which take account of semantic information than under those which measure purely syntactic information.

2 Variation in text type will affect failing readers more than normal readers; failing readers will be more successful in coping with Narrative than Informative texts while normal readers will be less affected by differences between the two types of text.

3 When texts are presented as a series of ISOLATED SENTENCES differences in score between failing and normal readers will be less than when the normal CONTINUOUS form of the

texts is used. The removal of the beyond-the-sentence context will deprive the normal reader of the information which he would otherwise have used; the failing reader makes less use of such information and so will be less afffected by its removal.

4 Normal readers' responses will show them to be chunking texts into larger units than failing readers.

5 Since deletions vary in the distance in the text at which cues are found the differences in performance between normal and failing readers will vary between deletions. Failing readers will resemble normal readers more on deletions which rely on cues within a five word segment.

6 Deletions which rely on the use of information from following context will be more difficult for failing readers than for normal readers.

7 Deletions which require the use of information from beyond the sentence will be more difficult for failing than for normal readers.

8 The grammatical form class of a deletion will affect the performance of all groups of readers but may have a proportionately greater effect on failing than on normal readers. Verbs will be more difficult to restore than nouns.

9 The standard frequency of a deletion, ie the frequency with which it occurs in the English language, will affect the ease of restoration. Failing readers who are likely to have restricted vocabularies will find common words easier to restore than less common ones; nine year old normal readers may also be affected by this factor but twelve year olds should be less affected.

10 The interaction of deletions within the sentence may affect all groups of readers but since normal twelve year olds are likely to make fewer errors they will be less affected by this interaction

than the other two groups.

11 An analysis of actual responses from the three groups of readers will provide information regarding differences in their processing of the text. Because of the number of these hypotheses and their implications, this report has been separated into three sections.

In this section the design, administration and overall scores are reported. Chapter 5 contains an analysis of individual items related to features of the texts and Chapter 6 reports the investigation of error responses.

II DESIGN

i Features of the design which test the hypotheses.

a **Scoring system:** To test Hypothesis 1 above three scoring systems were used.

i Verbatim (V) scoring: Only the exact-word deleted was accepted as correct.

ii Semantically-acceptable scoring (SEMAC). Any word which correctly restored the meaning and structure of the original was accepted as correct. The subjective element in this system was controlled by listing all the actual responses offered and submitting them to a panel of teachers of English. Only those responses which satisfied the panel were accepted as correct.

The usual method of deciding unacceptable answers employed by researchers using this system is to decide before the experiment which responses are to be regarded as acceptable. This method was

considered inadequate because the actual variety of responses offered by the subjects was much greater than anticipated and some offered responses might not have been considered by the constructor of the text. Therefore all the responses offered by the subjects were collected and judged.

iii Form-class scoring: Any word of the same grammatical form class as the deleted word was accepted as correct. This is referred to as FC score.

Verbatim and SEMAC scores contain a semantic element which is not present in form class scores and should therefore present greater differences between groups of readers under Hypothesis 1 above than form class scores.

iv Location score: The LOCATION task in which the subjects were asked to indicate by inserting a vertical line the position at which deletions had been made provided a fourth, structural, system.

b **Text Type:** To test Hypothesis 2 above, two passages of Narrative material and two of Informative material were used throughout. Two texts of each type were used to avoid specific features of isolated texts affecting results.

NARRATIVE text is defined for the purposes of the study by discourse force; the reader perceives its purpose as being to tell a story.

INFORMATIVE text is defined as having the purpose of presenting facts.

In order that observed differences between results on the two types

of text could be ascribed to text type, the following features of the texts were controlled.

i Readability level: A Fry graph was used to ensure that the texts were in the readability range of age eight to ten, equivalent to Grades 2 to 4.

ii Number of sentences: Each text consisted of nine or ten sentences.

Each text could thus be broken down into a series of ISOLATED SENTENCES at approximately the same size of fragment as each contained between 100 and 105 words.

iii Subject matter: Each text related to a situation or object which could be easily recognised by the children and which would yield a concrete image (Gillie, 1957).

iv Text specific factors: The use of two texts was an attempt to control this factor. However, throughout the results which follow it should be noted that these results relate only to the texts on which they were obtained and that replications using other texts will be required.

v Length of text: To equalise effects of fatigue or short concentration span the texts were all of approximately the same length, 100 to 105 words.

vi Sentence length: This was controlled by the interaction of readability level and number of sentences.

vii Amount of information: This was approximately equalised on the basis of the number of propositions contained. Each text contained between thirty and thirty-five propositions. This factor is however impossible to control as the amount of 'new' information in a text relates to the background knowledge of the

reader. It was assumed that the choice of subject matter would have equalised this effect but since children of different ages were involved it may not be possible to control this absolutely.

The texts, Appendix I.5, were chosen and adapted in accordance with these criteria.

c **Presentation:** To test Hypothesis 3 above two forms of test were produced. These are referred to as different PRESENTATIONS of the material, Appendix I.5.

The normal CONTINUOUS form of each text was presented on one page of a four page booklet.

The sentences in each text were numbered and selected by the use of random number blocks so that one sentence from each text could be placed on each page of a nine page booklet. In this ISOLATED SENTENCE PRESENTATION the subjects had access to only one sentence from each text at a time. One extra sentence from the text which had ten sentences was included but was not adjacent to the other sentence from the same text on the same page. There were thus eight pages with four sentences each and one with five.

Order of pages in the booklets was varied to equalise practice and fatigue effects.

By comparing performance on ISOLATED SENTENCE PRESENTATION with that on CONTINUOUS PRESENTATION the extent to which information from beyond the sentence affected performance could be calculated.

d **Structures Within the Text:** To test the use of purely syntactic information, in addition to Form class scoring, two FORMS of each test were created.

Normal CLOZE FORM had a standard twelve space gap to mark the position of each deletion.

LOCATION FORM had no physical indication of the positions from which words had been deleted. Subjects were required to LOCATE each position and to mark it with a vertical line between the two adjacent words.

e **Summary of Design:** There were four types of text booklet each containing all the text material.

Test 1: Each text was typed as a continuous passage with no gaps to indicate the position of deletions. Each text was placed on a separate page of a four page booklet. Order of pages within the booklets varied. The subjects were required to locate the positions from which the deletions had been made by inserting a vertical line in the text. This test is described as the CONTINUOUS PRESENTATION of the LOCATION TASK.

Test 2: Each text was typed as a CONTINUOUS passage with a standard twelve space gap to mark the position of each deletion. Booklets were made up as for Test 1. This test is referred to as the CONTINUOUS PRESENTATION of the CLOZE TASK.

Test 3: One sentence from each text was placed on each page of a

nine page booklet. Order of sentences and pages was varied. The position of each deletion was not marked in any way; subjects were required to mark the position of each deletion with a vertical line. They then inserted the response at the top of the line. These responses were not required for analysis but the restoration was included in the task to equalise the amount and levels of processing used.

This test is referred to as the ISOLATED SENTENCE PRESENTATION of the LOCATION TASK.

Test 4: Booklets were made up as for Test 3 but with a standard twelve space gap to mark the position of each deletion. Subjects were required to write one word in each gap. This test is referred to as the ISOLATED SENTENCE PRESENTATION of the CLOZE TASK.

By the use of these four tests and the three scoring systems it was possible to measure the use of information from beyond the sentence, the effect of the physical presence of a gap, the use of syntactic and semantic information and the influence of Narrative and Informative material.

ii Factors which require to be controlled in the design of the experiment.

In order that results could be reliably related to the hypotheses there were certain factors which required to be controlled.

a **Text Frequency:** The number of times a deleted word

appears elsewhere in the text will affect the response, as shown in Preliminary Study 1. This factor was controlled by ensuring that no deleted word appeared on more than two other occasions in the text. Standard frequency and form class, the other two features of words which affected ease of restoration, are investigated in the item analysis reported in Chapter 5.

b **Interaction of deletions:** Not more than two deletions were made from any sentence. Pairs of deletions within sentences were analysed for interaction effects.

c **Position of deletion in sentence:** No first words of sentences were deleted. The effects of position of deletion in the sentence and sentence length were investigated.

d **Frequency of deletions:** A minimum of four words was left between deletions. The words underlined in the appendix were deleted. All deletions belong to the classes of nouns or verbs. Fifteen words were deleted from each text.

III CHOICE OF SUBJECTS

The design of the experiment was intended to yield a three-way analysis of variance with the main factors as Presentation, (Isolated sentence or Continuous), Text type, (Narrative or Informative), and Groups of Readers (a,b,c see over) (Lindquist, 1953, p239).

The population from which samples were to be drawn was the first year of secondary pupils and the fifth year of primary pupils within the

same catchment area.

Three groups were created.

a Failing readers in first year of secondary education with chronological ages between twelve years and thirteen years six months at the time of testing and reading ages two years or more below chronological age on the Schonell Silent Reading Test R3.

b Normal readers of the same chronological age but with reading ages equivalent to their chronological age.

c Normal readers of the same reading ages as the failing readers.

Since the mean reading age of the failing readers was around nine years the pupils in five Primary 5 classes whose chronological ages were between nine and ten years were tested by the Schonell test. Four groups equivalent to the group of failing readers in mean score were created. It was possible to create groups of forty subjects.

Table 4.1: Sample matching on the Schonell Silent Reading Test

Raw Score	Frequency of occurrence in Group				
	A	B	C	D	Failing
16	2	3	1	2	3
15	10	10	7	7	6
14	3	3	4	4	5
13	6	8	2	4	7
12	5	4	8	7	2
11	7	5	10	8	6
10	2	-	2	-	3
9	3	2	5	4	3
8	1	3	1	3	-
7	1	2	-	1	-
6	-	-	-	-	2
5	-	-	-	-	3
mean	12.5	12.6	12.1	12.1	11.8
SD	2.3	2.6	2.1	2.4	3.2
SD^2	5.6	7.0	4.4	5.8	9.8x

Groups A-D = 9 year olds

Groups A, B, C and D are therefore groups of nine-year old normal readers; these are referred to as 'nine-year olds': N = 160

For the failing readers N = 40

The normal twelve year olds, referred to as 'twelve-year olds', consists of two groups of twenty-two subjects: N = 44

IV ADMINISTRATION

Each TEST was taken by 80 nine-year olds, 22 twelve year olds and 40 failing readers.

Each test session lasted one hour and was broken up into a period for explanation, two work periods and a five minute rest period. All subjects completed the tests within the time allotted. Subjects were provided with drawing materials for the rest period and the time remaining after they had completed the test. The same script was used for giving instruction on each occasion, Appendix I.6.

Each group of normal readers completed two tests. In order to make possible direct comparisons between the two PRESENTATIONS, Isolated sentence and Continuous, and the two FORMS, Location and Cloze, each group of nine-year olds and twelve-year olds completed a different pair of tests. Table 4.2 illustrates the tests taken and comparisons made for each group of normal readers.

Table 4.2: Order of Administration of Tests

Group of Readers	First Session	2nd Session	Comparison
A	Isol.sent.location	Cont.location	Within Beyond sent.location
B	Isol.sent.cloze	Cont. cloze	Within Beyond sent. cloze
C	Cont. location	Cont. cloze	Location cloze on cont.
D	Isol.sent.location	Isol. sent.	Location cloze on isol.sent
E	Isol.sent.location	Cont.location	Within Beyond sent.location
F	isol.sent.cloze	Cont. cloze	Within Beyond sent. cloze

A two week interval elapsed between test sessions and the tests were always completed in the order which gave the least information first; isolated sentence before continuous and location before cloze.

The normal twelve year olds were not used in a direct comparison between the location and cloze tasks because it was expected that their more developed control of syntax (Palermo and Molfese, 1972) and the level of difficulty of the texts would enable them to locate all the items thus making the location task equivalent to the cloze task. The extent and nature of their use of information from beyond the sentence was the focus of the comparisons.

The failing readers completed all four tests with a two week interval between sessions. The order of completion was isolated sentence location, isolated sentence cloze, continuous location and continuous cloze.

For the purpose of analysis of variance each group was halved and the scores of one half on the Narrative texts was compared with the scores of the other half on the Informative texts.

This reduced the number of subjects in each cell to twenty in comparisons involving failing readers and nine-year olds and eleven in all comparisons involving twelve year olds. In the latter comparisons eleven failing readers and eleven nine-year olds were selected at random from the groups of twenty already established.

V RESULTS

Table 4.3: Results of analysis of Variance: Values of F

Group of Readers	Source of Variance				W	Scoring System
	Text type	Group of Readers	Presentation	Text type V* Group of Readers		
Failing+9s			26.80xx		12.67	
Failing+12s		63.90xx	12.22xx		9.49	V
9s + 12s		27.00xx	29.23xx		9.22	
all groups		30.87xx	21.10xx		10.50	
F + 9s	21.85xx		27.95xx		24.05	
F + 12s		51.84xx	23.29xx		17.06	SEMAC
9s + 12s	14.14xx	44.05xx	29.99xx		17.85	
all groups		35.55xx	31.96xx	5.35xx	19.39	
F + 9s	5.41x				29.93	
F + 12s	15.49xx	38.06xx		5.80x	13.17	FC
9s + 12s		33.73xx			20.72	
all groups		26.68xx		9.94xx	19.21	
F + 9s	15.96xx				31.14	
F + 12s		79.79xx		9.77xx	14.86	L
9s + 12s	8.05xx	115.04xx			14.11	
All groups		51.38xx		7.15xx	17.89	

V=Verbatim SEMAC=Semantically acceptable FC=Form Class L=Location
*No other interaction reached significance level. Only values of F which reached significance level are shown p .05 x
p .01 xx

		N	Df
Degrees of freedom:	Failing readers and 9 year olds	20	152:1
	Failing readers and 12 year olds	11	80:1
	9 year olds and 12 year olds	11	80:1
	All three groups	11	120:2
			or 120:2

Only values of F which achieved significance are shown. All are significant at the .01 level except those marked x which are significant at the .05 level.

Values of t between means were calculated for each group of readers to give the following values:

t1: The value of t between means on Narrative and on Informative material.

t2: The value of t between means on Isolated sentence and Continuous Presentation. This was calculated for Narrative and Informative texts separately and for the total over both types of material.

t3: The value of t between means of failing readers and other groups.

The means and standard deviations on which these calculations are based are given in Table 4.4.

Table 4.4: Mean scores on Narrative and Informative Texts

Scoring Systems	Presentation											
	Isolated Sentence						Continuous					
	Narrative Texts			Informative Texts			Narrative Texts			Informative Texts		
	12	9	F	12	9	F	12	9	F	12	9	F
Verb.												
Mean	8.4	5.1	5.3	9.2	4.8	6.0	13.0	9.0	8.8	12.8	8.5	8.1
SD	1.9	2.6	2.9	2.4	2.7	3.1	2.3	4.0	3.4	3.5	4.2	4.1
SEMAC												
Mean	14.5	9.4	10.2	12.7	5.8	7.5	21.6	15.1	14.7	17.4	10.5	10.3
SD	2.9	3.8	4.1	3.2	3.0	3.7	3.2	5.0	5.3	4.4	5.2	5.5
Form Class												
Mean	27.1	22.6	22.8	27.4	19.7	20.8	27.7	23.2	23.8	28.5	22.3	22.5
SD	1.6	4.2	5.7	2.8	5.5	5.8	1.3	4.9	4.7	2.0	5.9	5.9
Locat.												
Mean	25.0	17.4	17.9	23.9	13.1	14.0	25.2	17.4	18.3	23.3	15.6	14.3
SD	2.6	4.4	5.6	2.6	5.5	5.4	2.1	5.2	6.2	2.5	5.8	6.0

Verb. = Verbatim Locat. = Location

Table 4.5: Values of t between means

p .05 x p .01 xx p .001 xxx

Presentation	Group of Readers																	
	12 year olds						9 year olds						Failing					
Text Type *	isolate.sent.			continuous			isolate.sent.			continuous			isolate.sent.			continuous		
Scoring System	N	I	E	N	I	E	N	I	E	N	I	E	N	I	E	N	I	E
Verbatim																		
t1	-	-	1.8	-	-	0	-	-	0.7	-	-	0.8	-	-	1.3	-	-	0.8
				xxx	xxx	xxx				xxx	xxx	xxx				xxx	xxx	xxx
t2	-	-	-	6.8	3.9	6.2	-	-	-	5.4	4.6	5.7	-	-	-	7.9	4.4	7.0
	xxx	xxx	xxx	xxx	xxx	xxx		x										
t3	4.4	4.2	5.3	5.5	4.9	6.0	0.4	2.0	1.3	0.2	0.5	0.5	-	-	-	-	-	-
SEMAC																		
			x			xx			xx			xx			xx			xx
t1	-	-	1.8	-	-	3.6	-	-	3.2	-	-	3.0	-	-	3.1	-	-	3.6
				xxx	xxx	xxx				xxx	xxx	xxx				xxx	xxx	xxx
t2	-	-	-	7.6	3.9	6.1	-	-	-	5.7	4.8	5.5	-	-	-	7.7	4.8	7.4
	xxx	xxx	xxx	xxx	xxx	xxx		x										
t3	5.7	7.9	5.6	6.0	5.5	6.2	0.9	2.2	1.5	0.3	0.2	0.3	-	-	-	-	-	-
Form Class																		
									x			x						
t1	-	-	0	-	-	0	-	-	2.1	-	-	1.3	-	-	1.5	-	-	0.7
											x						x	x
t2	-	-	-	1	1	1	-	-	-	0.7	2.0	1.5	-	-	-	1.1	2.1	1.8
	xxx	xxx	xxx	xxx	xxx	xxx												
t3	3.8	5.4	4.7	3.3	5.0	5.0	0.2	0.9	0.6	0.5	0.2	0.3	-	-	-	-	-	-
Location																		
t1	-	-	1.2	-	-	2.6	-	-	2.2	-	-	0.9	-	-	3.2	-	-	3.0
t2	-	-	-	1	1	1	-	-	-	0	2.1	1.2	-	-	-	0.8	0.5	0.6
	xxx	xxx	xxx	xxx	xxx	xxx												
t3	6.1	8.8	7.7	5.4	7.2	6.6	0.4	0.8	0.7	0.7	1.0	0.2	-	-	-	-	-	-

t1 = between means on Narrative and on Informative texts
t2 = between means on Isolated Sentence and on Continuous Presentation
t3 = between mean for Failing Readers and other groups

The similarities and differences shown in Tables 3,4 and 5 are summarised in Table 6.

VI DISCUSSION OF RESULTS

i Influence of scoring system

Under all scoring systems the scores of normal twelve-year olds were significantly different from those of the failing readers at the .001 level. The scores of failing readers and nine-year olds did not differ significantly under any scoring system except on the isolated sentence presentation of informative texts.

The analysis of variance shows that the main effects are different under different scoring systems; in particular the effect of presentation, isolated sentence or continuous, is shown to be present only under the two semantically based scoring systems. That is, information from beyond the sentence does not affect form class or location scores. The results for verbatim scores contradict the result of Preliminary study 3 in which variation in presentation produced no significant change in verbatim scores.

Hypothesis 1, that scores of different groups of readers would be more alike on form class and location scores than under the two semantic scores is not upheld; although values of F are lower under syntactic, form class scoring than under verbatim or SEMAC, they are still significant at the .01 level and values of F under location scoring are actually higher than under the other two systems.

There is therefore a larger contribution from local, syntactic, structure in the failure of the subjects than had been predicted.

This would support the finding of Killey and Willows (1981) who found that less-skilled readers had difficulty in pinpointing errors on orally presented material. It may therefore be seen as a correlate of the general language deficiency of the subjects and not a specifically 'reading' failure.

ii Influence of text type

Hypothesis 2 above stated that failing readers would be more affected by Text TYPE than normal readers. Table 4.3 shows a significant interaction between group of readers and text type under three of the four scoring systems. All three groups appear to be affected differently by the change from Narrative to Informative material.

A particularly significant contrast is in the values of t_1 in Table 4.5. Nine-year olds are more affected by text type on Isolated sentences than on continuous presentation while twelve year olds show the opposite effect. Failing readers are equally affected under both presentations. This is the first indication of a difference between the three groups in the processing of text.

iii Influence of isolated sentence and continuous presentation

This effect is shown to be significant for all three groups under verbatim and SEMAC scoring. It produced no significant interactions in the analysis of variance but the values of t_2, table 4.4 on Informative texts under form class scoring for nine-year olds and failing readers and location scoring for nine-year olds indicate that

there may be some effect.

The nine-year olds, particularly, showed a greater increase in Form class scores from Isolated sentence to Continuous Presentation on Informative than on Narrative texts.

Hypothesis 3 above that changes in PRESENTATION would affect normal readers more than failing readers is shown to be an over-simplification.

Table 4.6: Quantitative differences and similarities between 12 year old, 9 year old and failing readers

Scoring System	Verbatim			SEMAC			Form Class			Location		
Group of Readers	12	9	F	12	9	F	12	9	F	12	9	F
1. Sig difference from failing readers	x	I Inf	-	x	I Inf	-	x	-	-	x	-	-
2. Sig difference between text types	-	-	-	x	x	x	-	I	-	C	I	x
3. Sig difference between presentations	x	x	x	x	x	x	-	Inf	Inf	-	Inf	-
4. High correlation between presentations	Inf	Inf	x	x	x	x	-	x	x	Narr	x	x
5. Mean gain in score from Isolated Sentence to Continuous Presentation	8.2	7.7	5.5	11.8	10.2	7.2	1.7	3.3	2.6	0.4	2.5	0.7

Narr = only on narrative items I = only on Isolated Sentence Presentation
Inf = only on Informative items C = only on Continuous Presentation
x = feature present

VII SUMMARY

In this section cloze scores have been used purely quantitatively. They have clearly reflected the levels of reading ability of the three groups of readers. The syntactic contribution to reading development and failure has been shown to be considerable.

The effect of TEXT TYPE (Narrative and Informative) has been shown to be a complex one differing for different groups of readers. This is studied further by the analysis of items in the next section.

The use of Information from beyond the sentence appears to affect semantic scores for all three groups of readers and, to a lesser extent, syntactic scoring systems for failing readers and nine-year olds.

The VERBATIM scoring system has been shown to be less sensitive to the influence of text type.

This section has dealt with only the first three hypotheses. In order to investigate the remaining qualitative hypotheses it was necessary to analyse the individual words deleted in terms of text structure and to correlate this analysis with the responses of the subjects.

CONCLUSIONS REGARDING HYPOTHESES

This chapter has dealt with hypotheses 1 to 3, p 109. Neither Hypothesis 1, that differences in score between normal and failing readers will be greater under semantic scoring systems, nor Hypothesis 3, that scores of failing and normal readers will be closer on isolated sentence presentation was confirmed. Hypothesis 2, that failing readers were relatively more successful in dealing with Narrative tests, was confirmed.

A list of findings regarding all hypotheses is contained in Appendix III, p 287.

Hypothesis 1 : Differences in score between normal and failing readers will be greater under scoring systems which take account of semantic information than under those which measure purely syntactic abilities: This hypothesis was not confirmed.

Hypothesis 2 : Variation in text type will affect failing readers more than normal readers; failing readers will be more successful in coping with Narrative than Informative material: Confirmed.

Hypothesis 3 : When texts are presented as a series of isolated sentences differences in score between normal and failing readers will be less than when the normal continuous form of the texts is used. Not confirmed.

Hypothesis 4 : Normal readers' reponses will show them to be chunking text into larger fragments than failing readers: Confirmed.

Hypothesis 5 : Differences in response between normal and failing readers will vary between deletions: Confirmed.

Hypothesis 6 : Deletions which rely on the use of following context will be more difficult for failing than for normal readers: Confirmed.

Hypothesis 7 : Deletions which require the use of information from beyond the sentence will be more difficult for failing than for normal readers: Confirmed.

Hypothesis 8 : Verbs will be more difficult to restore than nouns and this effect will be greater for failing than for normal readers: Confirmed.

Hypothesis 9 : The standard frequency of a deletion will affect the ease of restoration: Confirmed.

Hypothesis 10 : The interaction of deletions within a sentence will affect all groups of readers: Confirmed.

CHAPTER 5: ITEM ANALYSIS

From the nature of the quantitative results in Chapter 4, it was clear that the three groups of readers had produced different patterns of response. Differences appeared to be associated with variation in text type and the presence or absence of context beyond the sentence. This suggested that analysis of responses to individual deletions might be related to description of specific features within the text to yield qualitative information regarding differences between groups of readers.

Items were analysed first in terms of factors within the text at various levels and then in terms of the responses of the subjects. The two analyses were then compared to investigate which factors within the text affected the subjects and which levels of text description were most relevant to the reading process as reflected in cloze tests.

I CRITERIA OF TEXTS WHICH AFFECT DELETIONS

i Text type Narrative or Informative, (abbreviated Narr. and Inf.). Thirty items came from narrative texts and thirty from informative. This distinction reflects discourse force as defined by Brewer (1980). At the discourse level of description items were also described in terms of the systems of description of Halliday and Hasan (1976), Frederiksen (1975) and Barthes (1980), see Chapter 2 II.

ii Form class Noun or Verb, (abbreviated to N and V). There were thirty-two nouns and twenty-eight verbs in the deletions. This distinction is relevant not only to the effects of grammatical form class discussed in Chapter 3 but also to the phrase level of text description, Chapter 2 II above.

iii Position of word in sentence Expressed as an ordinal number. This factor relates to sentence level text description and the interaction effect between deletions discussed in Chapters 3 and 4.

iv Dale-Chall rating. The standard frequency of the deleted words was not measured exactly as most of the words were fairly common. The Dale-Chall lists of 769 and 3500 words (Harrison, 1980) were used to classify words as 'Common', if they were on the 769 word list, 'Known', if they were on the 3500 list, and 'Rare' if they were not on the lists. The abbreviations C, K and R are used for these three categories.

v Predictability from preceding context In view of the evidence regarding differential use of following context (Neville and Pugh, 1977) it was necessary to identify those deletions which did not depend on the use of following context for their restoration.

A group of nineteen fluent sixteen year old readers were given the tests as a listening test. The text was read aloud up to the first deletion and the subjects were asked to write the next, ie the deleted word. They were then told the correct word and the text was read up to the next deletion. They therefore had information which differed from the younger readers in several ways.

i It was presented orally.

ii They had no access to following context at any time when restoring a deletion.

iii They knew the correct response to every preceding deletion.

iv They probably brought to the task greater world knowledge and linguistic skills than the younger subjects.

Since there were nineteen subjects in the group, each item could be assigned a 'PREDICTABILITY RATING' of between 0 and 19 depending on how many of the subjects predicted the correct answer. The Semantically acceptable scoring system was used.

Table 5.1 shows the items arranged in order of Predictability; items from Narrative and Informative texts have been listed separately.

Table 5.1: Predictability compared with frequency of correct cloze response expressed as a percentage of subjects in the group

Narrative Items	Pred	Group of Readers 12	9	F	Informative Items	Pred	Group of Readers 12	9	F
1.7 sound	19	95	85	95	3.2 years	19	100	90	85
2.15 chance	19	100	90	95	3.3 kinds	19	68	40	45
2.11 John	19	100	85	92	4.1 metal	19	82	37	42
2.7 Rock	19	95	90	77	4.8 made	18	73	70	72
2.9 river	19	95	100	77	3.15 eggs	18	95	75	65
1.13 hole	19	77	57	65	4.15 paper	18	50	22	2
1.10 road	19	95	47	60	4.3 paper	17	59	52	82
2.4 stream	19	77	70	22	4.7 see	16	95	82	75
1.14 tyre	18	59	50	65	4.13 found	16	77	30	30
2.8 jump	18	100	82	60	4.5 drawing	15	88	67	57
1.6 hill	16	54	52	67	3.11 movements	14	82	20	30
1.11 stop	16	73	35	45	4.6 pencils	13	68	25	37
2.5 tired	16	95	62	40	4.12 men	12	59	37	47
2.13 boy	15	86	67	65					
1.12 looked	15	86	57	57	3.8 distance	9	9	2	2
1.5 seconds	14	82	72	75	4.2 mark	6	54	55	65
2.6 decided	14	45	7	2	3.4 water	6	45	55	27
1.15 fix	13	73	57	52	4.4 using	5	73	50	30
					4.10 time	4	91	62	65
2.10 carrying	8	68	52	52	3.9 sides	4	45	35	22
1.3 bike	7	77	32	47	3.1 appeared	3	14	20	10
1.9 keep	5	32	5	12	3.5 passes	3	45	5	2
2.14 held	4	82	42	32	4.14 made	2	59	20	17
2.3 while	3	73	50	40	3.13 look	1	59	20	22
1.2 hair	3	50	17	12	3.10 tell	1	45	12	12
2.12 felt	2	32	20	27	3.14 cod	1	45	5	10
1.8 fight	2	4	0	0	3.6 take	1	18	5	2
1.4 sounded	1	64	17	20	3.12 lay	0	77	37	32
1.1 bend	0	64	30	55	3.7 see	0	27	2	7
2.2 ridden	0	95	57	45	4.9 called	0	41	10	5
2.1 John	0	27	15	10	4.11 went	0	18	0	5

The table shows a fairly clear division into items of High and Low Predictability; a frequency of twelve or more indicates that the item is highly predictable and therefore requires little use of following context; a frequency score of nine or less indicates low predictability. The abbreviations H and L are used for these two groupings.

The table also shows the mean frequency of correct response under the semantically appropriate system for each group of readers. Table 5.2 shows the mean frequency of correct response for the groups

of items of high and low Predictability for each group of readers. Tables 5.3 and 5.4 compare the Predictability of Nouns and Verbs and of words at different positions within the sentence.

Table 5.2: Mean frequency of correct response for items of high and low Predictability

Text Type	Narrative		Informative	
Group of Readers	High Predict.	Low Predict.	High Predict.	Low Predict.
12 year olds	83%	56	76	45
9 year olds	65	28	50	23
Failing	62	29	51	20

Table 5.3: Predictability of nouns and verbs

Form Class	Mean predictability rating (out of 19)		
	Narrative texts	Informative Texts	Total
Noun	13.4	12.0	12.7
Verb	8.0	5.0	6.4
Total	11.4	8.7	10.0

Table 5.4: Predictability and frequency of correct cloze response related to position of word in sentence

		Mean position (in Words) of items in sentence			
Group of Readers	Measure	Narrative texts High rating	Low rating	Informative Texts High rating	Low rating
16 yr olds	Predict.	7.3	6.8	9.4	5.2
12 yr olds	Cloze score	7.3	6.2	7.7	6.4
9 yr olds	Cloze score	7.2	6.9	8.6	6.5
Failing	Cloze score	7.2	6.9	9.1	6.6

vi Number of acceptable alternatives

Items were rated in terms of the number of alternative responses which had been judged by the panel of teachers of English to be acceptable. For some items there were no acceptable alternatives, for others there were up to nine. This figure reflects the degree of

lexical constraint acting on an item; items with no alternative may be more difficult to restore than those with several. The average number of acceptable alternatives was 2.2. This figure did not vary significantly between Nouns and Verbs, items of High and Low Predictability or according to Dale-Chall rating or position of word in sentence. There was however a significant difference between items deleted from Narrative texts and those from Informative texts; the mean number of acceptable alternatives was 2.9 for Narrative and 1.5 for Informative.

SUMMARY

Table 5.5: Relationships between Criteria of Text

Criterion	Form Class		Text Type		Position in Sentence	Dale Chall rating			Predict. High	Predict. Low	Mean Number of Acceptable Alternatives
	N	V	Narr	Inf		C	K	R			
1. Nouns	32	-	17	15	7.0	21	6	5	21	11	2.3
Verbs	-	28	13	15	7.0	24	4	-	10	18	2.2
2. Narrative	17	15	30	-	7.0	22	5	3	18	12	2.9
Informative	13	15	-	30	7.0	23	5	2	13	17	1.5
3. Position in	7.0	7.0	7.0	7.0	-	7.4	4.6	8.2	8.0	5.9	-
in sentence											
4. Dale Chall C	21	24	22	23	7.4	45	-	-	24	21	2.2
Rating K	6	4	5	5	4.6	-	10	-	4	6	2.3
R	5	-	3	2	8.2	-	-	5	3	2	2.0
5. Predictability											
High	21	10	18	13	8.0	24	4	3	31	-	2.4
Low	11	18	12	17	5.9	21	6	2	-	29	2.1
6. No of Acc Alts	2.3	2.2	2.9	1.5	-	2.2	2.3	2.0	2.4	2.1	2.2

The table summarises the inter-relationships between the factors described above. Of particular interest to the study of failing readers is the interaction between Predictability and other factors.

II DESCRIPTION OF DELETIONS IN TERMS OF SUBJECTS' RESPONSES

Each item was considered in terms of the frequency of correct response from each group of readers under the Semantically-

acceptable scoring system on both Presentations, Isolated sentence and continuous. It was decided to separate the items into groups on the basis of the use of information from beyond the sentence.

TYPE 1: Items which could be correctly restored by more than half the group on Isolated sentence presentation were assigned to type 1, the 'easy' or 'within sentence' group.

TYPE 2: Items which could not be correctly restored by half the group, or more, on Continuous presentation, that is when the total context was available, were assigned to type 2, the 'difficult' group.

On items of both types 1 and 2 there was a difference of less than five between the frequency of correct response on Isolated sentence presentation and the Continuous presentation. That is, less than five subjects in any group were helped by the presence of information from beyond the sentence. When the frequency of correct response rose by five or more between Isolated sentence and continuous presentations, the item was assigned to type 3.

TYPE 3: Items in this category show a number of subjects, five or more in any group probably making use of information from beyond the sentence. The type was sub-divided into 'difficult' items, type 3a, on which the frequency of correct response on Isolated sentence presentation was less than half the group and type 3b, on which half or more of the group gave a correct response on Isolated sentence presentation.

A second element was introduced into the classification system to reflect lexical restriction on responses as measured by the readers. Sub-types i and ii were differentiated on the basis of semantically acceptable scores on continuous presentation; sub-type i includes those items on which the semantically acceptable score was less than five points higher than the Verbatim score; that is subjects were likely to provide the exact-word deleted rather than a near synonym. Sub-type ii included those items which produced a larger numer of semantically acceptable responses; the difference in frequency of correct response under the two systems was five or more.

This framework was applied to the responses of each group of readers to each deletion. Table 5.6 shows the classification of items by these reader determined criteria and by the criteria of the text described in Chapter 5.

Table 5.6: Classification of Items

Item no.	Description	Group of Readers			Item no.	Description	Group of Readers		
		12	9	F			12	9	F
1.1 bend	N5KL4	2i i	3ai i	2i i	3.1 appeared	V3KL3	1i i	2i i	2i
2 hair	N4CL5	3ai i	2i	2i	2 years	N9CH0	1i	3bi	3bi
3 bike	N3KL0	3bi	3ai	3ai	3 kinds	N8CH3	3ai i	3ai	3ai i
4 sounded	V9CL2	1i	3ai	2i	4 water	N6CL0	3ai	3ai	3ai
5 seconds	N3CH2	3bi i	1i i	3bi i	5 passes	V4CL1	2i	2i	2i
6 hill	N11CH1	3ai	3ai	3ai	6 take	V9CL1	2i	2i	2i
7 sound	N9CH2	1i i	1i i	1i i	7 see	V3CL0	2i	2i	2i
8 fight	V4CL1	2i	2i	2i	8 distance	N13RL1	2i	2i	2i
9 keep	V9CL1	2i	2i	2i	9 sides	N8CL1	2i i	3ai i	2i i
10 road	N6CH9	3bi i	1i	1i i	10 tell	V2CL1	3ai	3ai	2i
11 stop	V12CH2	1i	2i	2i	11 movements	N7RH6	3ai i	3ai	3ai
12 looked	N5CH1	3bi	3ai	2i	12 lay	V2KL0	1i	3ai	3ai
13 hole	N7CH7	1i	1i	1i	13 look	V8CL0	2i	2i	2i
14 tyre	N13RH1	3ai	3ai	3ai	14 cod	N2KL3	3ai i	2i	2i
15 fix	V6CH3	3ai	3ai	3ai	15 eggs	N9CH0	1i	3ai	3ai
2.1 John	N5RL0	2i	2i	2i	4.1 metal	N6KH3	1i	2i	1i
2 ridden	V10CL7	1i i	1i i	3ai i	2 mark	N5CL1	2i	2i	3ai
3 while	N3CL4	1i	2i	2i	3 paper	N14CH0	1i	3ai	3bi
4 stream	N10KH6	3ai i	3ai i	2i i	4 using	V7CL0	1i	3ai	2i
5 tired	V6CH3	3bi i	3ai i	3ai i	5 drawing	V15CH0	1i	1i	3ai
6 decided	V2KH2	3ai	2i	2i	6 pencils	N5KH0	3ai	3ai	3ai
7 rock	N9CH0	1i	1i	1i	7 see	V6CH3	1i	1i	1i
8 jump	V6CH4	3ai	3ai i	3ai	8 made	V12CH2	1i i	3ai i	3ai i
9 river	N13CH4	3ai i	3ai i	1i i	9 called	V3CL1	3ai	2i	2i
10 carrying	V11CL11	1i i	3ai i	3ai i	10 time	N3CL4	1i i	3ai i	1i i
11 John	N3RH2	1i i	3ai i	3bi i	11 went	V10CL2	2i	2i	2i
12 felt	V11CL3	2i i	2i i	2i i	12 men	N2CH3	1i	2i i	2i i
13 boy	N3CH1	3ai	3ai	3ai	13 found	V12CH3	1i	3ai	3ai i
14 held	V8KL2	3bi	3ai	3ai	14 made	V2CI1	3ai	3ai	2i
15 chance	N5CH1	1i	1i	1i	15 paper	N14CH0	3ai i	3ai	3ai

*N5KL4 = Noun, 5th Word in sentence, Dale Chall rating = Known, Low Predictabilty, 4 acceptable alternatives

III RELATIONSHIPS BETWEEN GROUPS OF READERS ON THE BASIS OF ITEM ANALYSIS:

Table 5.7: Number of items assigned to each type by each group of readers

Item Type	Narrative			Informative			Total		
	12	9	F	12	9	F	12	9	F
1	10	7	6	13	2	3	23	9	9
2	5	8	12	8	12	14	13	20	26
3	15	15	12	9	16	13	24	31	25
3a	9	15	10	9	15	11	18	30	21
3b	6	-	2	-	1	2	6	1	4

Value of chi-square = 14.8 p 0.01

Table 5.8: Number of items assigned to each sub type by each group of readers

Item Sub type	Narrative Texts			Informative Texts			Total		
	12	9	F	12	9	F	12	9	F
i	18	19	19	22	25	24	40	44	43
ii	12	11	11	8	5	6	20	16	17
1i	6	4	3	10	2	2	16	6	5
1ii	4	3	3	3	-	1	7	3	4
2i	3	7	9	7	10	12	10	17	21
2ii	2	1	3	1	2	2	3	3	5
3i	9	8	7	5	13	10	14	21	17
3ii	6	7	5	4	3	3	10	10	8

i Items assigned to different types by all three groups

Only two items came into this category. For both of these the types assigned were the same, twelve-year olds assigned Type 1, nine-year olds, Type 3 and failing readers, Type 2.

ii Items assigned to the same type by all three groups of readers:

a **Items of Type 1**: (Easy to restore within the sentence). Five items, four of them from Narrative material were correctly restored within the sentence, Type 1, by all three groups. All five items have High Predictability rating and strong local cues eg 'from rock-to-rock'.

b **Items of Type 2**: (Difficult). Ten items, five of them from Text 3, Informative material, proved difficult to restore for all three groups. Six of these items are sentence pairs, that is two deletions from the same sentence, and of these four are in two consecutive sentences of Text 3. There is therefore a strong possibility of interaction affecting these deletions.

Eight of the items are verbs. Difficulty of verbs as compared to nouns may be related to the theories of Sanford and Garrod (1981). They suggest that, in reading, the subject constructs scenarios related to his predictions about the text. These scenarios are verb dependent structures, the verb creating slots which must be filled with nouns from the subject's lexicon. The restoration of a verb is therefore a more difficult process than that of a noun.

The two nouns assigned to Type 2, 'difficult', by all three groups are both Rare in terms of Dale-Chall rating 'distance' and the proper name 'John'. Other factors which will be shown to create difficulty are the dependence of 'distance', Text 3, on the deleted verb 'see' and the fact that cues for 'John', Text 2, are to be found only at a considerable distance from the deletion in following context.

c **Items of Type 3** (Involving the use of information from beyond the sentence): Thirteen items, eight Narrative and five Informative were assigned to this category, use of beyond sentence information, by all three groups. Eleven of these were obviously dependent on the reader being aware of the theme of the text which is not revealed within the sentence, eg 'These were the first - pencils'.

Of the other two items one depends on lexical reference to the preceding sentence, 'jump', Text 2, and the other forms a logical connective between the preceding and following sentences, 'tired', Text 2.

iii Items assigned to the same category by normal and failing twelve year olds but not nine year olds

Only five items are in this group. Two of these come from Text 4 and may be related to the greater background knowledge of the older children or to their familiarity with history texts.

Two other items in this group were difficult for all three groups but nine-year olds made more use of information from beyond the sentence than the other two groups.

The remaining item was correctly restored within the sentence, Type 1, by nine year olds while the other groups made more use of information from beyond the sentence to refine their prediction, 'seconds', Text 1.

iv Items assigned to the same type by normal twelve year olds and nine year olds but not by failing readers

This was the most important group of items since it would provide the first evidence concerning the hypotheses regarding the nature of reading failure.

Only eight items were involved. In four of these normal readers of both ages made more use of information from beyond the sentence, Type 3 than failing readers, Type 2. In two the normal readers were able to restore the deletion within the sentence, Type 1, while the failing readers were not very successful even when using total context, Type 3a.

Only two deletions showed a reversal of these two patterns; 'river', Text 2, failing reader Type 1, normal readers Type 3, and 'mark', Text 4, normal readers Type 2, failing readers Type 3.

v Items assigned to the same type by nine year olds and failing readers but not by twelve year olds

Seventeen items belong to this group. If we consider both the failing readers and the nine-year olds as 'less skilled' than the twelve year olds the differences in type are in the expected direction.

Eight items which the less skilled readers found difficult, Type 2, were assigned by the twelve year olds either to Type 1, four items, or Type 3, four items.

Eight items which the twelve year olds found 'easy', Type 1, were assigned by less skilled readers to Type 3. That is the twelve year olds made more efficient use of both within and beyond sentence information.

The remaining item in this group was assigned to Type 1 by the less skilled readers while the twelve year olds used beyond sentence information to refine their original predictions and assigned the item to Type 3b.

vi Summary

The picture which emerges from this analysis indicates that some items

did not distinguish between skilled twelve year olds and the less skilled nine year olds and failing readers. In fact twenty-eight of the sixty items were 'non-discriminating.'

The nine-year olds performed significantly more like the twelve year olds on Narrative material (twenty items) than on Informative material (sixteen items) while the failing readers assigned the same type as the twelve year olds on eighteen Narrative and fifteen Informative items. This reflects the influence of Text Type on the nine-year olds as shown in Chapter 4.

Nine-year olds also made significant use of information from beyond the sentence on more items than the other two groups. The normal twelve year olds were more efficient at processing information within the sentence and therefore did not require to rely on information from beyond the sentence. The failing readers however were not efficient at either within or beyond sentence processing.

IV RELATIONSHIPS BETWEEN READER RESPONSES AND CRITERIA IN THE TEXT

i Text type and discourse structure

Tables 5.7 and 5.8 indicate the difference between item types on Narrative and Informative texts.

The nine-year old readers found a larger number of easy Type 1, items on Narrative than on Informative and Twelve year olds were able to make more use of beyond the sentence information Type 3, on Narrative. Informative material was more difficult for all three groups.

By looking at more specific aspects of discourse structure it was intended to gain information regarding the specific features which contributed to this result.

a Cohesive Ties

The application of the system devised by Halliday and Hasan (1976) to the texts used in the present study produced the following table.

Table 5.9: Item types assigned to deletions involved in cohesive ties

Text	No. of deletions involved in cohesive ties	Total No. of cohesive ties in text	Group of Readers								
			12 year olds			9 year olds			Failing		
			1	2	3	1	2	3	1	2	3
1	3	17	1	-	2	1	-	2	1	-	2
2	7	21	1	1	5	-	1	6	1	2	4
3	9	19	3	1	5	-	2	7	-	3	6
4	6	13	3	1	2	1	1	4	1	-	5
tot	25	70	8	3	14	2	4	19	3	5	17
No of items not involved in cohesive ties			15	10	10	7	16	12	6	21	8

Type 3 items which are classified as those in which beyond sentence information played a significant part are involved in cohesive ties in approximately sixty per cent of cases for twelve year olds and nine year olds but in seventy per cent for failing readers. This may reflect a different type of beyond sentence processing, with the failing reader being more dependent on specific ties within the text while normal readers rely to a greater extent on their own background and linguistic knowledge and use of inference.

Difficult items, Type 2, are shown to be unconnected to the system of cohesive ties except in a very few cases and their difficulty

must be seen as reflecting a lack of specific semantic cues at both local and discourse level. The three cohesive items ascribed to Type 2 by normal twelve year olds are all presuppositions, that is the first part of the tie, and thus necessitate looking ahead in the text for the relevant cueing. Failing readers assigned to Type 2 two presuppositions and three second parts of ties while nine-year olds assigned three presuppositions and one second part. There is therefore a possible difference in reading behaviour between failing and normal readers not only in the extent to which they rely on specific cohesive ties but also in the way in which they make use of them.

It might have been expected that all Type 3 items would be involved in cohesive ties. Analysis by text shows that of the thirty Type 3 items not involved in cohesive ties fourteen come from Text 1, seven from Text 2, eight from Text 4 and only one from Text 3.

Text 1 contains as many cohesive ties as the others but the cohesive ties were not sampled fully by the deletions. It is suggested that the pattern of cohesion in Text 1 was as strong as in the other texts and that the lack of deletion of cohesive ties made it simpler for the subjects to follow the development of the text. The nature of cohesion is investigated further in the following section by looking at actual error responses, Chapter 6.

b **Semantic Networks**

Frederiksen's system of semantic networks (1975) distinguishes between verbs of process and those of resultive action. The verbs in the four

in the four texts used in this study were classified in this way and the results related to the item types assigned by the subjects.

The first point of importance to be noted was that verbs of process appeared significantly more difficult to predict (mean Predictability rating 4.5), than are those of resultive action, (mean Predictability rating 8.3). Accordingly, verbs of process may be more difficult to restore than verbs of resultive action.

Table 5.10: Item types assigned to different types of verb

Item type	Verbs of process			Verbs of resultative action		
	12	9	F	12	9	F
1	5	2	1	6	1	-
2	5	7	10	3	5	7
3	4	5	3	5	8	7

The small number of items involved would prevent meaningful results appearing from further subdivision of the category of verbs, or 'actions', but the basic difference in response indicates that cloze could be used to investigate this area further.

The second half of Frederiksen's semantic system, objects, is similarly divided into two main categories, processive and static. Twelve nouns could be attributed to each of these, the remaining nouns being involved in the locative or temporal systems.

Table 5.11: Item types assigned to different types of object

Item type	Processive Objects			Static Objects		
	12	9	F	12	9	F
1	3	-	1	4	3	4
2	1	4	5	2	2	1
3	8	8	6	6	7	7

Fredericksen's system again appears to relate to cloze responses.

c Barthes' system

The text segments which Barthes identified (1980) at the levels of 'functions' were relevant to the texts used in the present study. Since not all the texts were Narrative they could not be compared at the level of Narration and since they were short and, for the most part, factual, the level of indices, indicators of character, atmosphere etc., was not widely represented. The texts were therefore divided into segments which were classified as nuclei, catalysers and informants.

Nuclei are of direct consequence to the development of the text and introduce a new concept; they are points at which the logical structure of the text may be changed.

Catalysers add details to the main points introduced by the nuclei and provide areas in which much of the content is predictable and consequent upon a nucleus.

Informants add to the main development line, provided by a framework of nuclei, information regarding time and space. Deletions were classified according to the type of segment in which they occurred and this classification was compared to the item types assigned by the readers.

Table 5.12: Item types assigned to Nuclei, catalysers and informants

Item type	Nuclei			Catalysers			Informants		
	12	9	F	12	9	F	12	9	F
1	7	1	2	10	5	4	6(11)	3 (5)	3 (5)
2	6	10	11	4	7	10	3 (5)	3 (5)	5 (9)
3	10	12	10	10	12	10	4 (7)	7(13)	5 (9)

Figures in brackets are included to indicate proportionate results if number of informants had been equal to number of Nuclei and catalysers

Normal twelve year olds appear to experience less difficulty in processing nuclear functions than the other two groups of readers but all three groups by allocating more nuclei to Type 2, (difficult), and more catalysers to Type 1, (easy), show that they experience a greater uncertainty at nuclei.

The class of informants included fewer deletions than the other two classes of functions, and figures in brackets have been provided by proportion to enable comparisons to be made. It is in this class that a distinction between failing readers and others is most obvious; they assign to Type 2, difficult, more informants than do the other two groups of readers. In fact, the responses of failing readers show less ability to distinguish betwen the three classes of function than do the two groups of normal readers. A contribution to reading failure may therefore come from an inability to assign appropriate levels of logical importance to different text segments.

All three systems of text description make some contribution to understanding differences in the reading process at discourse level between normal and failing readers.

The system of cohesive ties has shown a stage in the development of normal readers at age nine during which they require to make more use

of information from beyond the sentence than do older normal readers. Failing readers remain more dependent on cohesive ties for beyond sentence information until age twelve.

It is also possible that a cloze test which deletes elements of cohesive ties will be more difficult to process than one which does not.

An examination based on Frederiksen's system of networks shows that within the two basic classifications of actions and objects his first sub-division is related to a clear difference in cloze processing between Processes and Resultive actions and between Processive and Static objects. This distinction may affect less skilled readers more than normal twelve year olds. The distinction involves semantic structures as well as word meanings and the difficulty may apply to oral language processing as well as to reading.

Barthes' system shows the importance of the ability to recognise different emphases within a text and to follow its logical framework; that this ability is to a large extent inherent in the reader is shown by the large number of Nuclei which were assigned to Type 1, easy - within sentence - by normal twelve year olds. Like the system of cohesive ties, this result shows the twelve year old to be contributing more to the interpretation of the text from his own previous experience than do the other two groups of readers.

Since it has been established that these systems of text description have some relationship to cloze responses they are discussed again in relation to error responses in Chapter 6.

ii Phrase level description: Nouns and Verbs

Table 5.13: Item types assigned to Nouns and Verbs

Item type	Nouns			Verbs		
	12	9	F	12	9	F
1	12	6	8	11	3	1
2	5	8	9	8	12	17
3	15	18	15	9	13	10
Sub type i	18	23	21	22	21	22
Sub type ii	14	9	11	6	7	6

Table 5.14: Values of Chi-square in Table 5.13

p . .05 x p .01 xx

a) **within groups** between Nouns and Verbs:
12 year olds 1.2
9 year olds 1.3
Failing readers 9.8 x

b) **Between groups**

	On Nouns	On Verbs
12s and 9s	2.8	6.2 x
12s and Failing	2.0	11.8 xx
9s and Failing	1.2	1.1

The table shows that nouns are more influenced than verbs by information from beyond the sentence, Type 3, and that more verbs than nouns proved difficult to restore, Type 2. The results for Sub-type ii, difference between exact-word responses and near synonym responses of more than five, suggest that for both groups of older readers there are more alternatives accessible for nouns than for verbs. Table 5.5 has shown that the number of acceptable alternatives for nouns and verbs was the same and this difference is therefore a feature of the readers rather than the deletions. It is possible that the extra difficulty associated with the processing of verbs leaves less attention for a lexicon search.

Table 5.15: Mean Form Class and Location Scores for Nouns and Verbs

Group of Readers	N	Mean Frequency of correct response under form class Scoring		location Scoring	
		Nouns	Verbs	Nouns	Verbs
12	22	20.4	19.7	18.8	17.0
9	40	29.8	27.2	23.2	17.4
F	40	30.7	27.5	23.7	18.6

This table together with the evidence concerning scanning and chunking presented in previous sections points to the importance of text description at the phrase level. In particular the distinction observed between noun and verb deletions must be seen in relation to the generative grammars which take noun and verb phrase markers as their two main constituents (Fodor, 1977). An analysis of the phrases from which deletions have been made reveals the following information.

a **Noun Phrases**

The average length of noun phrase is 3.2 words. There are nouns occupying the positions of subject, object, complement and modifier; the latter category has been divided into those before and those after the verb.

Table 5.16: Item types related to function, position and length of Noun Phrases

Function of Noun Phrase	Mean length in Words	No. of items	Item type assigned by 12 year olds			9 year olds			Failing readers		
			1	2	3	1	2	3	1	2	3
Subject	2.6	7	2	1	4	0	4	3	0	4	3
Object	2.4	7	2	2	3	1	1	5	1	1	5
Complement	3.3	3	2	0	1	1	1	1	2	0	1
Modifier before verb	4.0	4	2	1	1	1	1	2	1	2	1
Modifier after verb	3.7	11	4	1	6	3	1	7	4	2	5
Total before verb	2.7	11	4	2	5	1	5	5	1	6	4
Total after verb	3.2	21	8	3	10	5	3	13	7	3	11
All Noun Phrases	1	2	1	0	1	0	0	2	0	0	2
	2	6	2	1	3	1	2	3	1	3	2
	3	12	3	3	6	2	3	7	3	3	6
	4	9	3	1	5	2	3	4	2	3	4
	5	1	1	0	0	0	0	1	0	0	1
	6	2	2	0	0	1	0	1	2	0	0

The significant factors in terms of assigning difficulty are whether the noun comes before or after the verb and whether or not it is a subject.

b. Verb Phrases

The average length of verb phrases is 6.2 words and it is suggested that the greater length of phrase may be a cause of the increased difficulty of restoration as compared to nouns. Within the groups of noun and verb phrase, phrase length does not correlate with difficulty but, as the tables show, the length of verb phrases is almost always greater than the longest noun phrase.

Complexity of structure of verb phrase does not appear to be correlated with difficulty.

Table 5.17: Item types related to structure and length of Verb Phrase

Structure of Verb Phrase	Mean length in Words	No. of items	Item type assigned by 12 year olds			9 year olds			Failing readers		
			1	2	3	1	2	3	1	2	3
Verb + Obj	4.7	9	2	3	4	-	4	5	-	6	3
V+Modifier	5.5	8	3	3	2	-	4	4	-	5	3
V+Obj+Mod	7.3	5	2	1	2	2	2	1	1	3	1
Mod+V+Mod	10.0	1	-	1	-	-	1	-	-	1	-
Aux + V	4.0	2	1	-	1	-	1	1	-	1	1
Aux+V+Mod	9.0	3	3	-	-	1	-	2	-	1	2
All Verb Phrases	6.2	28	11	8	9	3	12	13	1	17	10
All Verb Phrases	2	1	-	-	1	-	-	1	-	-	1
	3	2	-	2	-	-	2	-	-	2	-
	4	7	2	3	2	-	4	3	-	5	2
	5	5	2	-	3	-	1	4	-	2	3
	6	3	1	2	-	-	2	1	-	2	1
	7	4	3	-	1	1	1	2	-	2	2
	8	1	-	-	1	-	1	-	-	1	-
	9	1	-	-	1	-	-	1	-	1	-
	10	2	2	-	-	1	-	1	-	1	1
	11	2	1	1	-	1	1	-	1	1	-

Phrase level description does not appear to be as useful as discourse level systems in explaining difficulties of cloze restoration. The difference between noun and verb deletions has been shown to consist of an element of lexical constraint together with an extra inferential demand in the restoration of a verb.

iii Word level description: Dale-Chall rating

Table 5.18: Item types related to Dale Chall lists

Item type	Dale Chall list on which deletion occurs								
	(45) 769 words			(10) 3500 words			(5) Neither		
	12	9	F	12	9	F	12	9	F
1	19	9	8	3	0	1	1	0	0
2	10	14	19	1	4	5	2	2	2
3	16	22	18	6	6	4	2	3	3

The number of 'rare' and 'known' words, ie those not on the Dale-Chall list of 769 words most commonly occurring in the English language, would make it impossible to generalise from these results except to point out that the fact that a word is 'common' does not automatically make it easy to restore.

iv Sentence level description

This factor of position of deletion in sentence has already been shown to relate to predictability and to cloze scores on informative material for nine-year olds and failing readers.

Table 5.19: Item types related to position of word in sentence

Item type	Mean position of word in sentence								
	Narrative texts			Informative texts			Total		
	12	9	F	12	9	F	12	9	F
1	7.8	7.0	8.2	7.7	10.5	5.0	7.7	7.8	7.1
2	6.8	6.3	7.6	7.5	5.7	5.4	7.2	5.9	6.0
3	6.6	7.5	6.9	5.4	7.5	9.1	6.1	7.5	8.0

The results for informative material indicate considerable differences between the three groups of readers. Nine-year olds find words which occur later in the sentence easier to restore and use beyond sentence information, Type 3, for deletions in average positions. Failing readers use beyond sentence information in restoring items which occur later in the sentence in contrast to normal twelve year olds who assign to Type 3, Beyond sentence information, more items which occur earlier in the sentence. This may relate to the type of beyond sentence information being used or to the way in which the sentence is being processed.

The processing of complete sentences has been shown to be more efficiently done by twelve year olds (Type 1 items). The ability to process the sentence unit must therefore be seen as an important factor in reading development. A description of a text as a collection of sentences may yield valuable insights into the reading process.

Deletions were therefore considered in relation to both sentence length and sentence type.

Table 5.20: Item types related to sentence structure and length

Sentence Type	No. of items	Mean length in words	Item type assigned by 12 year olds			9 year olds			Failing readers		
			1	2	3	1	2	3	1	2	3
Simple	35	10.0	15	5	15	7	12	16	6	15	14
Compound	10	11.8	1	3	6	-	2	8	-	6	4
Complex	15	13.1	7	5	3	2	6	7	3	5	7
All		<9	2	1	5	1	3	4	2	3	3
		9	1	-	6	1	1	5	1	2	4
Sentences		19	3	2	3	-	4	4	-	6	2
		11	-	-	2	1	-	1	-	-	2
		12	4	1	3	3	2	3	3	3	2
		13	2	4	2	-	4	4	1	4	3
		14	3	2	3	-	2	6	1	3	4
		15	5	3	-	3	3	2	1	4	3
		16	3	-	-	-	1	2	-	1	2

There is an indication that twelve year olds found compound sentences more difficult to process than simple ones and were less likely to use information from beyond the sentence on complex sentences. The effect of longer sentences is less marked on nine-year olds and failing readers. This may be because the twelve year olds are trying to process the sentence as a unit and are therefore more affected by its length than the less skilled readers who are working with smaller chunks.

Since sentence structure affected item types the division of sentences into clauses was investigated.

Table 5.21: Item types related to clause structure

Item type	Subordordinate clauses before main cl.			after main cl.			Total for all subordinate cl.			Expected Total *		
	12	9	F	12	9	F	12	9	F	12	9	F
1	1	-	-	3	-	-	4	-	-	3	1	1
2	-	-	-	2	3	3	2	3	3	2	2	3
3	1	2	2	-	2	2	1	4	4	2	4	3

Expected total = 7/60 x total for all 60 items

Because of the nature of the material used, only seven items were in subordinate clauses; of these, two come before, and five after, the principal clause. There is no evidence that subordinate clauses were more difficult to process than principal clauses but those which come after the main clause may be more difficult than those which come before.

A further factor associated with sentence level description in cloze tests is the interaction of deletions within the sentence.

There were twenty-three sentences which contained two deletions. The interaction was studied by classifying the pairs of deletions

according to a four cell table; passed both, failed both, passed the first but not the second and passed the second but not the first. The frequency of occurrence of each case in each group of readers was counted.

Table 5.22: Interaction of deletions within sentence

Group of Readers	Passed Both	Failed Both	Passed first Failed second	Failed first Passed second
12	15	3	3	2
9	9	3	4	7
Failing	6	4	5	8

Table 5.23: Item types related to pairs of deletions within sentences

Item type	First deletions in sentence			Second deletion in sentence		
	12	9	F	12	9	F
1	9	4	4	10	3	2
2	5	10	12	6	7	9
3	9	9	7	7	13	12

The second item in a sentence again appears easier to restore for nine-year olds and failing readers but not for twelve year olds. Failure on the first item was associated with failure on the second in thirty per cent of cases on which the first item was failed for nine year olds and failing readers and in fifty per cent of cases for twelve year olds.

Interaction of deletions over segments longer than a sentence would have led to an increase in Type 2, difficult, items towards the end of a text. The total number of items assigned to each of the three item types over the first five, second five and last five deletions in all four texts gave the following results indicating that no such cumulative effect was acting.

Table 5.24: Number of items of each type in first five, second five and third five deletions in each list

Item type	1st 5 deletions			2nd 5 deletions			3rd 5 deletions		
	12	9	F	12	9	F	12	9	F
1	9	3	1	6	4	6	8	2	2
2	4	7	9	6	7	9	3	6	8
3	7	10	10	8	9	5	9	12	10

v Predictability rating:

Table 5.25: Item types related to predictability

Pred. Item Type	Narrative texts						Informative texts						Total					
	High			Low			High			Low			High			Low		
	12	9	F	12	9	F	12	9	F	12	9	F	12	9	F	12	9	F
1	6	6	6	4	1	0	9	2	2	4	0	1	15	8	8	8	1	1
2	0	2	4	5	6	8	0	2	1	8	10	13	0	4	5	13	16	21
3	12	10	8	3	5	4	4	9	10	5	7	3	16	19	18	8	12	7

Predictability was shown to be clearly related to ease of restoration for Type 1 items, particularly in the responses of twelve year olds. This would indicate that the predictability of these items was a within sentence feature since they could be restored within the sentence.

Twelve year olds were able to overcome low predictability on eight items, the other groups on only one each. In each of these two cases cues were available in the immediately following context; 'ridden - their bikes' and 'time-of Queen Elizabeth.' In both cases the information is within ten letter spaces of the deletion.

The low predictability items of Type 1 in the responses of twelve year olds must indicate the use of information from the following part of the sentence, since no other sentence was available on isolated sentence presentation.

The inclusion of Type 3, beyond the sentence, items in those of low predictability does not necessarily involve the use of information from following sentences. The preponderance of items of high predictability in Type 3 indicates that beyond sentence information is twice as likely to come from preceding sentences, those which contribute to predictability, as from following context. The Low predictability items assigned to Type 3 were therefore analysed for cues in the following context within and beyond the sentence. In fact, cues for all the items involved were to be found within the succeeding four words; the average cue range was 2.4 words for failing readers, 2.6 words for twelve year olds and 2.7 words for nine year olds. There is no evidence of use of information from following sentences in these tests.

The items of Type 2, difficult, support this argument; for twelve year olds these items are all of Low Predictability with cues at an average distance of 8.2 words in the following context. For nine-year olds the cue range for Type 2 items is 7.3 words on average and for Failing readers, 6.3 words. The need to scan ahead for cues is a major contribution to item difficulty.

vi Number of acceptable alternatives

Table 5.26: Items related to average number of acceptable alternatives

Item type	Average number of acceptable alternatives		
	12 year olds	9 year olds	Failing Readers
1	2.6	3.4	3.7
2	1.2	1.9	1.9
3	2.5	2.1	2.1
Subtype i	1.3	1.7	1.5
ii	4.0	3.8	4.1

Lexical constraint is shown to be greater on items of Type 2 difficult, than on the other two item types for all groups of readers.

vii Syntactical contribution to difficulty

Table 5.27: Item types related to form class and location Scores

Item Type	Mean frequency of correct response under form class Scoring						location Scoring					
	Nouns			Verbs			Nouns			Verbs		
	12	9	F	12	9	F	12	9	F	12	9	F
1	20.4	34.8	36.5	20.8	33.7	34.0	18.9	29.8	29.8	17.4	18.3	31.0
2	20.2	30.4	28.8	20.1	25.8	26.6	19.2	22.6	21.7	15.6	16.8	17.4
3	20.5	27.8	28.9	17.9	27.0	29.3	18.6	21.2	21.7	17.8	17.8	19.4

Possible frequency for each group of readers = N : 12 year olds, N=22
9 year olds, N=40
Failing, N=40

The strength of the syntactical constraint acting on items of each type was measured by taking the mean frequency of correct response under Form class and Location scoring for each group of readers. Since a reliable measure of local constraint was required, frequencies were taken from the isolated sentence presentation.

The difficulty of locating verbs as opposed to nouns may be explained in terms of the need for re-construction associated with the deletion of a verb.

In form class scores it is not suggested that the results for Type 2, difficult, items imply difficulties of syntactic origin but that, where processing difficulties exist, syntactic as well as semantic features may be involved.

V SUMMARY

Items were classified by features within the text at the level of word, phrase, sentence and discourse. They were also classified according to whether the three groups of readers found them easy to restore within the sentence (Type 1), difficult to restore within the total context (Type 2), or easier to restore in the presence of information from beyond the sentence (Type 3).

The twelve year old readers were shown to be more efficient at both within and beyond sentence processing than the other two groups. Nine year olds made use of beyond the sentence information on a greater number of items than did the older readers and were more like twelve year olds in their responses to Narrative than Informative texts.

Narrative texts were easier to process than Informative for all three groups. Descriptions of discourse in terms of cohesive ties (Halliday and Hasan 1976), were found to be related to use of beyond sentence information on only sixty to seventy per cent of cases; failing readers were more dependent than other groups on these cues.

Difficult items, those of Type 2, were found to be either the first half of a cohesive tie necessitating the use of following context for restoration, or not to be involved in cohesive ties. The deletion of a significant number of cohesive elements may increase the difficulty of processing a text.

Semantic distinctions between processes and resultive actions, as defined by Frederiksen (1975b), and between static and processive objects may relate to difficulty of cloze restoration.

The ability to distinguish between units of text which are logically important to the development and other functions as defined by Barthes (1980) is characteristic of normal twelve year olds who are equally capable of handling both types of unit; nine year olds find the important 'nuclear' functions more difficult to restore than the other less important units. Failing readers do not appear to recognise differences in importance between units.

At discourse level the three groups of readers are separated by both specific semantic features within the text and by their own ability to follow the logical structure.

Phrase level text description appears to be relevant to cloze difficulty only in the basic distinction between noun and verb phrases and in the position of the noun phrase in relation to the verb phrase. Phrase length and internal structure do not appear to contribute to variation in difficulty. Nouns are easier to restore than verbs.

Word level description indicates considerable differences between the three groups of readers on Informative material. Nine-year olds and failing readers find words which occur early in the sentence more difficult to process. The influence of longer sentences was greater on twelve year olds than on the other two groups; this may be because they are trying to process the sentence as a complete unit while the other readers are working wih smaller segments of text. The interaction between deletions is shown to affect between thirty and fifty per cent of second deletions in sentences in which the first deletion is not restored correctly. The second deletion within a sentence was generally easier to restore than the first.

Predictability from preceding context was found to be a major correlate of ease of restoration for all three groups of readers. Difficulty of restoration was directly related to the need to use information from following context. There was no evidence of use of information from following sentences but twelve year olds used information from further ahead in the sentence than did the other two groups.

Items which had few acceptable alternatives were shown to be more difficult than those which had several. Difficult items were found to have a greater degree of syntactic difficulty for nine-year olds and failing readers than for twelve year olds.

Contributions to difficulty of cloze response have been identified at discourse level in both semantic and logical processing and these features have been shown to affect different groups of readers differently. The processing of complete sentences efficiently, and the use of information from beyond the sentence, also distinguish between difficult and easy items and between groups of readers.

Lexical and syntactic levels also relate to difficulty of items and to distinctions between groups of readers.

The analysis of error responses reported in the next chapter investigates all these levels and relate the actual responses of the subject to these factors within the text.

CHAPTER 6: INVESTIGATION OF ERROR RESPONSES

Since it appeared that variations in difficulty between items could be related to some of the specific features of text described in Chapter 5, it was considered appropriate to classify the actual responses offered by the subjects and to relate the resulting classifications to these text features. The responses were classified by a system which is related to the model of the reading process described in Chapter 1.

I CLASSIFICATION SYSTEM

Some general features of the responses offered are examined here before the more detailed classification system is described.

i Zero responses

Table 6.1: Number of zero responses made by different groups of readers

Type of text	Isolated Sentence Presentation			Continuous Presentation		
	12 yr olds	9 yr olds	Failing	12 yr olds	9 yr olds	Failing
Narrative	0.5	3.8	3.5	0.2	3.5	1.9
Informat.	1.1	7.4	5.0	0.6	4.9	3.7
Total/N	1.6	11.2	8.5	0.8	8.4	5.6
%	4.9	25.1	20.1	3.8	24.4	16.0

% = percentage of total errors which are zero responses
Other figures are mean number per subject

A zero response is the complete absence of any entry in a gap.

Zero responses occur more frequently in the tests of nine year olds and more frequently on informative than on narrative material. There were fewer zero responses on continuous than on isolated sentence presentation.

ii Number of different responses offered

Table 6.2: Number of different error responses offered by each group of readers

Type of text:	Narrative			Informative			Total		
Gr. of readers:	12	9	F	12	9	F	12	9	F
Total different errors (mean)	15.7	13.7	15.0	15.8	13.4	14.3	31.5	27.1	29.3
Errors common to both present -ations	3.0	2.7	3.0	2.3	2.4	3.1	5.3	5.1	6.1
Errors found only on Cont. Presentation	5.2	4.5	5.6	4.8	5.2	4.8	10.4	9.7	10.0
Errors found only on Isol. Sentence Pres.	8.7	6.8	6.3	8.6	5.9	6.4	17.3	12.7	12.7

Figures are mean number per subject

This is taken as an indicator of the subjects' ability to generate alternative hypotheses. It is therefore significant that the mean number of different errors offered per subject is similar for all three groups on continuous presentation. The major difference between normal twelve year olds and the other two groups is in their ability to generate hypotheses around isolated sentences; the presence of continuous context may therefore be acting differently on the three groups of readers.

iii Responses not on the Dale-Chall 769 word list

Table 6.3: Responses not on the Dale Chall list of 769 words

Group of Readers	12 year olds	9 year olds	Failing
Total number of errors not on list	495	750	652
Mean number per subject	25.5	18.8	16.3
% of actual responses	44	32	26

% = % of (total errors - zero responses)

The figures represent the mean percentage of actual errors, that is not including zero responses, per subject which was not on the Dale-Chall list. Failing readers were using a more restricted lexicon than the other groups.

iv Categories of error

Incorrect responses were first divided into those which related to the theme of the text, Group T errors, and those which did not, Group N errors. It was argued that a reader working within the constraint of the theme was carrying out a significantly different task from one who was operating on a series of disconnected fragments.

Table 6.4: Ratio of Group N (not related to the theme) to Group T (theme related errors)

Group of Readers	12 year olds	9 year olds	Failing
Text type			
Narrative	.52	.40	.56
Informative	.41	.50	.90
Total	.46	.45	.69

Errors which were not related to the theme were classified according to the size of the text segment from which information appeared to have been used in their creation.

a **Group N Errors:** Errors NOT RELATED to the THEME of the text.

Category NC: Errors are correct within the sentence. Since the twelve year olds have been shown to be trying to process complete sentence units it is expected that more of their Group N errors will belong to this category than those of the other two groups. However, since they are also more efficient at using beyond sentence information, they will make fewer Group N errors; for this reason, errors of Groups N and T have been treated separately in the tables which follow to enable direct comparisons to be made between the three groups of readers when working within the theme, Group T errors, and outwith the theme, Group N errors. The figures given in the following tables are percentages within Groups N and T and not percentages of

the total number of errors. The ratio of Group N to Group T provides an indication of the actual frequency of occurrence of each category of error.

Category NH: Errors which appear to be based on information from only the preceding part of the sentence. The evidence regarding use of following context in previous sections indicates that errors of hesitation, where the reader hesitates at a deletion and does not use information from the following context except in the very local context of the deleted word, will provide a major distinguishing feature between groups of reader.

Category NP: Correct within the phrase. Since nine-year olds and failing readers do not appear to be processing sentences as complete units they may be found to produce more errors of purely local relevance than twelve year olds.

Category NN: Nonsense response. The attitude and previous experience of failing readers may make it more likely that they will fail to achieve any logical interaction with the text and will produce more Nonsense responses, which bear no relation to any part of the context, than do the other readers.

b Group T errors: Errors related to the theme of the text. T hese errors were classified in terms of the'part' of the reading process in which failure appeared to have occurred.

Category TS: Errors of syntax: Syntax has been shown to be associated with difficulty of restoration in the responses of failing readers and nine-year olds and these two groups may therefore be expected to produce a higher proportion of such errors than normal twelve year olds.

Category TV: Errors of vocabulary. Since failing readers are using a restricted lexicon in completing the tests, see Table 6.2, they may be unable to restore words which are semantically close to the target word while readers who are using a wider range of words are likely to offer more lexical alternatives.

Category TE: Errors of expectation. Since failing readers appear to generate fewer hypotheses than normal twelve year olds, the latter group may be more likely to make responses in terms of their own expectations which may be different from those of the author. Normal readers should therefore produce more errors of expectation, proportionately, than failing readers. These errors will be syntactically and semantically 'correct' but will fail to restore the original meaning.

Category TH: Errors of hesitation. Failing readers and nine-year olds may make less use of information from following context, other than the purely local context of the deletion; this will result in errors of hesitation which will not be produced so frequently by twelve year olds.

Category TR: Random errors related to the theme. When the reader recognises the constraint of the theme but cannot deal adequately with the local context, he may insert random responses related to the theme. Since twelve year olds are less likely to experience processing difficulties than the other two groups, they should produce fewer errors of this category.

A list of specimen responses of each category is given in Appendix I.7

Statistical treatment of the results in this section has been by the application of the chi-square statistic to raw frequencies. To enable

application of the chi-square statistic to raw frequencies. To enable comparisons to be made these frequencies have been converted to percentages of Group T or Group N errors. That is, the number of errors in each category in Group T is expressed as a percentage of the total number of errors in Group T over the same items.

c Hypotheses regarding the relative frequency of occurence of error categories

Error type	**Group of readers likely to produce higher proportion of responses of this type.**
GROUP T (Theme Related)	Normal 12 year olds and 9 year olds
TS: Errors of syntax	Failing readers and 9 year olds
TV: Errors of vocabulary	Normal 12 year olds
TE: Errors of expectation	Normal 12 year olds
TH: Errors of hesitation	Failing readers
TR: Random errors	Failing readers and 9 year olds.
Group N (Not related to the theme)	Failing Readers
NC: Correct within the sentence	Normal 12 year olds
NH: Related to preceding part of the sentence	Failing readers
NP: Correct within phrase	Failing readers and 9 year olds
NN: Nonsense	Failing readers

II RESULTS

i Differences between groups of readers

Table 6.5: Difference in patterns of error between groups of readers

Group of Readers	Total Number of errors	Number of errors in Group T	Group N	N/T	Percentage of errors of each group of TS	TV	TE	TH	TR	NC	NH	NP	NN
12	800	548	252	.46	5	48	32	9	5	74	10	8	9
9	1533	1060	473	.45	8	38	27	14	12	53	21	9	17
F	1538	912	626	.69	10	41	23	19	8	49	17	9	25

Values of chi-square between groups of readers: p: xxx < .001

	Group T responses	Group N responses
12s + 9s	40.6 xxx	33.4 xxx
12s + Fs	56.0 xxx	48.0 xxx
9s + Fs	23.3 xxx	9.4

Table 6.5 shows that the greatest difference between failing readers and the other two groups lies in the proportion of their errors which are not related to the theme of the text (Group N errors). In particular more of the Group N errors are of the 'Nonsense' category, NN, showing that they are failing to sustain logical interaction with the text at any level.

Errors of categories NH and TH, hesitation, show the increasing order of use of information from following context to be failing readers, nine year olds and twelve year olds. In these three categories, NN, NH and TH, nine-year olds resemble twelve year olds more than do failing readers.

Errors for category NC, correct within the sentence again show the twelve year olds as being better able to deal with complete sentences than the other two groups.

Errors of category NP, correct within the phrase, did not produce the

expected result in that all groups produced them equally. The contrast between results for categories NH, relying on the preceding part of the sentence, and NP, correct within the phrase, may indicate that all readers are trying to work with the sentence rather than the phrase unit.

Patterns of error produced when working within the theme of the text, Group T errors, show clear differences between normal and failing twelve year olds. Failing readers made more errors of syntax, category TS, and hesitation, TH, while normal readers produced more errors related to the generation of alternative hypotheses, category TE. The category of errors related purely to vocabulary, TV, did not significantly separate these two groups but did create a significant difference between normal readers at age nine and those at age twelve. Younger readers also produced more random errors, TR, showing that they continued to process the text as a logical whole even when local context proved difficult to process.

The system of error classification has therefore begun to show up qualitative differences between failing and normal readers and between normal readers at different ages.

ii Distribution of error categories

As in the preceding section, Chapter 5, the pattern of errors given in Table 6.5 masks significant differences in patterns of error between individual deletions. In the following description, error categories which contained only 1 response have been excluded.

Category TS, errors of syntax occur on only nine deletions. These may be divided into two groups. In the first the subjects overlooked, inserted or wrongly identified small items of visual information; that is these are errors of scanning. The six items in this group are described in Table 6.6

Table 6.6: Errors of Scanning

Item	Visual information giving rise to error	Response	Number of errors 12s	9s	F
1.12 looked	'at' overlooked	saw, fixed	0	1	6
2.2 ridden	'to' read as 'at'	left, put	0	3	5
	verb assumed	with	0	0	1
2.3 while	full stop overlooked	swim,picnic,race	3	4	9
2.13 boy	'the' overlooked	he	2	6	3
3.1 appeared	'were' assumed	seen, caught	0	1	1
4.5 drawing	'and' read as 'on'	paper	1	0	0
	'and' overlooked	letters	0	0	2

1 = text 'Alan' 2 = text 'John' 3 = text 'Fish' 4 = text 'pencils'

This visual contribution to reading failure appears to be considerable, but restricted, in its application.

The remaining three deletions which gave rise to errors of syntax were those in which the subjects wrongly restored the structure of the sentence. These may be errors at the level of chunking.

Table 6.7: Errors of Chunking

Item	Structural error	Sample responses	Number of errors 12s	9s	F
1.4 sounded	Ellipsis wrongly restored	noisy, just, it's	6	15	16
1.9 keep	Figure of speech 'keep control'	the, his, its, a	5	27	19
4.9 called	Adjective or adverb in place of participle	beautiful, still	11	28	26
		total	22	70	61

The ability to restore correctly local structure again appears to be a significant distinguisher between groups being greater, but more restricted, in its effect.

It has to be noted that nine-year olds had greater problems with restoration of structure, and failing readers with scanning; the qualitative nature of the difference in reading behaviour between the two groups indicates that failure is not a general 'late development' but is different in kind from normal reading.

Category TV, errors of vocabulary, occur on thirty eight items, twenty-eight in the responses of twelve year olds and thirty each for nine-year olds and failing readers. Twenty-one items are common to all three groups. The level of difficulty of the text may have controlled this factor and masked differences which might have arisen on texts on other subjects less familiar to the failing readers.

Category TE, errors of expectation, occasioned by the reader generating his own hypothesis, arose on thirty of the sixty items. Of these, eighteen were common to all three groups. It was expected that this factor might be related to low predictability but seventeen of the items involved were of Low predictability and thirteen of high predictability; in generating their alternative hypotheses, the readers overcame the constraint of high predictability. Eighteen of the items were from narrative, twelve were from Text 1 and six from Text 2; the remaining twelve were from informative material, eight from Text 3 and only four from Text 4. This would suggest that the generation of hypotheses like many other aspects of the reading process is controlled by the interaction between the reader and a specific text.

Category TH, errors of hesitation making little use of following context, occurred on twenty-six items but on only seven in the

responses of twelve year olds. Only three items gave rise to more than two errors of this type from twelve year olds. These were Item 2.6, 'decided', 3.7, 'see' and 4.14, 'made'. The responses of category TH offered by the twelve year olds were 'tried', ignoring the following two words 'to try' on item 2.6. Six twelve year olds gave this response. 'Swim' and 'breathe', on item 3.7, twelve of the group of normal twelve year olds gave these responses. The following context which is required for the correct restoration of this deletion is the following sentence, which deals with the sense of hearing, and, as has already been shown, there is no evidence of twelve year olds using information from following sentences; 'had' and 'was' on item 4.14 were offered by sixteen twelve year olds. These responses do not appear to follow logically from the preceding text and lead to the restoration of the whole clause as 'it had a thick black mark on it'.

Failing readers gave more responses of this type on more different items than did the other two groups.

Category TR, random errors arose on twenty-six items but on only four in the responses of twelve year olds. There were eleven items from Text 1, one item from Text 2 and seven each from Texts 3 and 4.

It would appear that within Group T, theme-related errors, those which reflect discourse level constraints are the categories of expectation or hypothesis generation, category TE, and of random errors, category TR.

Errors of scanning and chunking affect only a small number of deletions while errors of vocabulary are more generally created.

Errors of hesitation, category TH, reflect the distance of cues in the following context from the deletion.

Category NC, errors correct within the sentence occur on forty-three items, seventeen of them in the responses of twelve year olds. Table 6.8 shows how these items relate to the classification system used in Chapter 5.

Table 6.8: Occurrence of errors which are correct within the sentence related to item types

Number of items of type	1	2	3
Group of readers 12	5	3	9
9	6	5	14
F	4	13	14

Since Type 1 items were easy to restore within the sentence, by definition, it was to be expected that few errors which were correct within the sentence would occur on these items; the table shows that this is the case. Similarly, since Type 3 items were those which, by definition, involved the use of information from beyond the sentence, failure to use such information would be expected to produce errors which are correct within the sentence, category NC. The significant difference in the number of Type 2, difficult, items giving rise to errors which are correct within the sentence must be seen in relation to the smaller number of items on which failing readers used information from beyond the sentence. This would indicate that the failing readers differ from the other two groups not simply in the types of error which they produce but in the ability to recognise points in a text where the use of beyond sentence information may be helpful.

Category NH, errors relying on only the preceding part of the sentence, occurred on thirty items but on only four in the responses of twelve year olds. Seventeen of these items were on the two Informative texts, thirteen on the Narrative but, within each text type, they were equally distributed. That is, this category of error is not related to the specific structure of one text but may be related to the over-all effect of text type.

Category NP, errors which relate only to their immediate context, occurred on thirteen items, eight of them from Informative material. There was no relationship between this category and text type or predictability but the items had all been ascribed to Types 2, difficult, or 3, beyond sentence, by failing readers. This type of response may therefore occur in the presence of above average processing difficulty.

Category NN, nonsense errors, occurred on forty nine items but on only six in the responses of twelve year olds and nineteen in the responses of nine-year olds. Failing readers appear to be prepared to insert any response to a deletion when faced with difficulty in processing; nine year olds tend to leave a blank rather than insert a meaningless response, see Table 6.1.

The error categories were related to the Item types of Chapter 5; Item Type 1, easy to restore on the basis of within sentence information, Type 2, difficult to restore even in the presence of total context and Type 3, involving the use of information from beyond the sentence.

Responses of each category were totalled over all the items of each

type for each group of readers. The results are expressed as percentages but chi-square has been calculated on the basis of the actual frequencies. Values and significance levels of chi-square for Tables 6.9 to 6.20 are given in Table 6.21.

Table 6.9: Difference in patterns of error between item types

Group of Readers	Item Type	Percentage of errors of category TS	TV	TE	TH	TR	NC	NH	NP	NN	Number of responses Group T	Group N	N/T
12 (23)	1	11	57	26	4	2	62	11	15	11	100	53	.53
(13)	2	3	52	37	8	1	81	6	4	9	234	85	.36
(24)	3	6	40	30	13	11	75	11	7	7	214	114	.53
9 (9)	1	7	29	33	12	19	55	14	5	26	58	42	.72
(20)	2	11	41	29	10	8	57	19	7	17	533	219	41
(31)	3	5	38	23	18	16	49	24	11	16	469	212	45
F (9)	1	0	28	14	36	22	51	7	5	37	36	59	1.6
(26)	2	13	35	22	21	9	44	19	13	23	600	320	53
(25)	3	4	61	16	13	6	55	15	5	24	276	247	89

(Figures in brackets refer to number of items)

iii Relationships between reader responses and features of the texts

a Text Type and Discourse Structure

Table 6.10: Difference in patterns of error between narrative and informative texts

Type of Text	Group of Readers	Percentage of errors of category TS	TV	TE	TH	TR	NC	NH	NP	NN	Number of responses Group T	Group N	N/T
Narr.	12s	7	46	35	6	6	75	7	8	9	254	131	.52
(30)	9s	10	37	31	9	13	60	18	8	13	561	223	.40
	F	10	41	26	14	9	56	15	9	20	569	319	.56
Inf.	12s	4	50	30	12	4	72	12	7	8	294	121	.41
(30)	9s	6	41	21	20	11	46	24	9	22	499	250	.50
	F	8	40	16	28	7	43	18	10	29	343	307	.90

While informative material has a greater quantitative effect on nine-year olds than on failing readers, Table 6.10 shows that the qualitative effect is different for the two groups. Failing readers make proportionately more errors which are unrelated to the theme on informative than on narrative texts.

Table 6.6 has shown that errors of scanning occur almost entirely on narrative material; the errors of Category TS, errors of syntax, on Informative material are almost all accounted for by one item, 4.9 'called'.

Errors of expectation, Category TE, show that all groups appear to be making more 'predictions' in dealing with narrative than with informative material.

Errors of hesitation, Category TH and NH, increase on informative material and, since both TH and NH are involved, this may be related to the use of information from the following part of the sentence. Narrative items have been shown to be more predictable than informative, Tables 5.1 and 5.5.

Group N errors, those unrelated to the theme, show that both failing readers and nine-year olds have greater difficulty in dealing with complete sentences of Informative than of narrative material.

In all categories except those of random errors, TR, on informative material, nine-year olds are intermediate between normal and failing twelve year olds. On narrative texts, failing readers are closer to normal twelve year olds than are nine-year olds on three categories, TV, TR and NH.

i Cohesive ties

Table 6.11: Patterns of error response in Cohesive and Non-Cohesive Items

Group of Readers	Type of Item	Percentage of errors of category									Number of responses		N/T
		TS	TV	TE	TH	TR	NC	NH	NP	NN	Group T	Group N	
12 (25) (35)	Coh.	2	41	35	12	10	71	10	12	7	171	107	.62
	Non-C	7	51	31	8	3	75	10	5	10	377	145	.39
9	Coh.	3	35	25	21	16	56	19	10	15	296	203	.69
	Non-C	10	40	27	11	11	50	22	9	20	764	270	.35
F	Coh.	2	42	15	32	9	51	15	13	22	240	273	1.14
	Non-C	12	40	25	15	8	48	18	7	27	672	353	.52

The table indicates that cohesive items produce fewer errors than non-cohesive items and that a higher proportion of these errors are of Group N, unrelated to the theme; this suggests that if the reader is able to use the cohesive structure he is less likely to make an error. For all groups, cohesive items produced fewer errors by almost fifty per cent than non-cohesive items.

Errors of syntax, category TS, suggest that where semantic cueing is strong, as in a cohesive tie, syntactic difficulties are overcome. Normal readers at ages nine and twelve also appear to experience more purely lexical difficulties, category TV, in the absence of cohesive ties.

All groups make more errors of hesitation, TH, on cohesive than on non-cohesive items; this may relate to the need for the use of following context on those items in which the first part of a tie has been deleted.

While different patterns of error might be expected between cohesive and non-cohesive items, when a reader is working within the theme

(Group T errors), there seems to be no reason why a reader who is not so constrained should produce different types of error on the two groups of item. The larger proportion of errors on category NP, correct within the phrase, produced by both groups of twelve year olds on cohesive items is therefore difficult to explain.

ii Semantic networks

Table 6.12: Patterns of error on verbs of Process and Resultive action

Group of Readers	Type of Verb	Percentage of errors of category									Number of responses		N/T
		TS	TV	TE	TH	TR	NC	NH	NP	NN	Group T	Group N	
12 (14)	Proc.	9	35	44	11	1	9	48	9	35	195	23	.12
(14)	Res.	4	66	15	15	0	32	32	16	21	170	19	.11
9	Proc.	12	30	35	21	3	39	39	5	40	390	57	.15
	Res.	10	53	15	19	3	54	54	11	21	300	94	.31
F	Proc.	14	28	26	28	5	39	39	7	35	377	71	.19
	Res.	9	59	9	20	2	28	28	9	29	275	143	.52

The table shows a clear difference of behaviour in the restoration of the two types of action defined by Frederiksen's system (Frederiksen 1975), processes and resultive actions.

Verbs of process appear more difficult to predict, and to restore; this difficulty is seen to have syntactic correlates producing errors of category TS. They also appear to allow the reader more freedom to generate his own hypotheses, category TE, than do verbs of resultive action, which tend to produce purely lexical errors, category TV.

There is some indication that, in working outwith the theme, verbs of resultive action give rise to sentences which are easier to process, category NC, but the small number of Group N errors would not support a firm conclusion.

In the deletions of objects as opposed to actions, a similar difference in response between the two main types of object is indicated.

Table 6.13: Patterns of error on Processive and Static Objects

Group of Readers	Type of Object	Percentage of errors of category									Number of responses		N/T
		TS	TV	TE	TH	TR	NC	NH	NP	NN	Group T	Group N	
12 (12) (12)	Proc.	3	41	39	4	14	72	6	13	8	79	83	1.05
	Stat.	0	61	24	0	14	92	4	0	4	83	71	.86
9	Proc.	6	38	26	2	28	59	12	18	12	135	120	.89
	Stat.	0	42	19	4	34	71	10	4	15	183	112	.61
F	Proc.	3	57	19	3	17	49	10	18	23	98	187	1.91
	Stat.	0	36	28	9	27	68	10	2	20	116	133	1.15

All types of object give rise to more errors unrelated to the theme than do actions. There are fewer errors of syntax; this again suggests the extra processing load involved in restoring a verb by the necessity of re-creating the structure of the sentence.

The differing proportions of errors in categories TE and TV between verbs of process and resultive action and between processive and static objects in the responses of normal readers of both age groups may suggest a difference in either the linguistic difficulty associated with the network structures or in the ease and clarity with which the reader is enabled to construct an image. Failing readers' responses do not reflect this distinction.

Static objects gave rise to a higher proportion of errors which were correct within the sentence than did processive objects for all groups of readers.

iii Barthes' system

Table 6.14: Patterns of error on nuclei, catalysers and informants

Group of Readers	Type of Funct	Percentage of errors of category									Number of responses		N/T
		TS	TV	TE	TH	TR	NC	NH	NP	NN	Group T	Group N	
12 (23)	Nucl.	1	50	31	17	1	78	6	5	11	248	80	.33
(24)	Cat.	7	47	37	3	6	49	23	16	11	230	79	.34
(13)	Inf.	13	47	21	3	16	90	2	3	4	70	93	1.33
9	Nucl.	3	43	20	20	14	46	27	8	20	479	172	.36
	Cat.	13	32	36	9	9	32	32	15	21	417	156	.37
	Inf.	11	44	23	9	13	82	2	4	11	164	145	.88
F	Nucl.	4	50	15	23	8	55	16	5	24	420	244	.58
	Cat.	14	32	28	18	8	25	25	20	30	343	220	.64
	Inf.	17	36	30	9	9	73	5	2	20	149	162	1.09

Since nuclei, the points at which new developments are introduced into the logical framework of a text, are the most difficult of the three types of function to restore, it might be expected that the syntactic element seen in previous tables to be associated with difficulty of restoration would be reflected in a higher proportion of errors of syntax, category TS. In fact, as the table shows, this is not the case. Syntactic correlates of difficulty are not to be seen as being produced by increased processing load but by specific features within the text. Some of these features have been described above, Table 6.6 and 6.7.

Informants, which add details of time, location or manner, produce errors which are either related to the theme or correct within the sentence; very few responses of categories NH, NP or NN were produced on these items. Readers did not require to generate hypotheses regarding these deletions to the same extent as to other types of function; category TE errors therefore occur less frequently. The smaller proportion of errors of hesitation, TH, may reflect the nature of the cues on which these items depend; most cues are present in the

preceding rather than the following context, or in the immediately following context.

The difficulty of restoring nuclei may also be connected to the need to use following context, reflected in the responses of category TH. Since normal twelve year olds were able to overcome the increased difficulty associated with the restoration of nuclei, it is possible that the following context involved is within the sentence.

These three examples of systems of text description have illustrated the many levels of processing required by the cloze procedure and have suggested specific differences in reading behaviour between groups of readers and between different points within a text.

b **Phrase level description : nouns and verbs**

Table 6.15: Patterns of error on nouns and verbs

Group of Readers	Type of Funct	Percentage of errors of category TS	TV	TE	TH	TR	NC	NH	NP	NN	Number of responses Group T	Group N	N/T
12 (32)	Noun	3	46	36	2	14	85	3	6	5	183	210	1.15
(28)	verb	7	49	31	13	1	19	40	12	29	365	42	.11
9	Noun	4	36	28	4	29	70	8	9	12	370	322	.87
	Verb	11	40	26	20	3	15	49	8	28	690	151	.22
F	Noun	5	45	24	6	20	60	9	10	22	260	412	1.58
	Verb	12	41	19	24	4	29	32	8	31	652	214	.33

The basic difference in the ratios of Group T, theme related, to Group N, non-theme related, errors between nouns and verbs is strong evidence for a difference in processing between the two types of item. Verbs appear to constrain the subject to relate his response to the theme to a greater degree than do nouns.

The frequency of occurrence of errors of hesitation, TH and NH, and of errors correct within the sentence, NC, may indicate that the difference is related to the chunking of text; nouns appear to allow the subject to take note of the whole sentence to a greater degree than verbs. This may also be related to the greater use of information from beyond the sentence in the restoration of nouns. This may be related to the position of deletions within the sentence as well as to a basic structural difference in the processing of the two form classes.

Table 6.16: Patterns of response according to function and position of noun phrases

Group of Readers	Description of Noun Phrase	Percentage of errors of category									Number of responses		N/T
		TS	TV	TE	TH	TR	NC	NH	NP	NN	Group T	Group N	
12 (11)	before verb	7	44	28	3	18	82	6	6	6	68	92	1.35
(21)	after verb	1	47	42	1	9	89	2	7	3	115	118	1.03
9	before verb	9	36	29	3	23	73	12	7	7	144	117	.81
	after verb	1	37	27	4	32	70	5	11	14	226	205	.91
F	before verb	10	46	25	3	16	61	11	6	22	120	167	1.39
	after verb	0	45	23	9	24	59	7	12	21	140	245	1.75
12 (7)	subject	4	58	11	4	23	78	7	5	9	48	66	1.38
(7)	object	0	52	45	3	0	82	18	0	0	66	11	.17
(18)	modifier	4	31	43	0	21	88	0	9	3	69	133	1.93
9	subject	8	50	10	4	29	72	16	6	7	94	90	.96
	object	2	31	26	6	35	29	23	10	38	115	47	.41
	modifier	3	32	40	2	24	80	1	11	9	161	185	1.15
F	subject	4	68	5	4	19	62	14	6	17	75	119	1.58
	object	0	32	25	12	30	28	23	4	44	66	64	.96
	modifier	8	38	34	4	16	68	2	13	17	119	229	1.92

Table 6.17: Patterns of response related to structure of verb phrase

Group of Readers	Structure of Verb Phrase	Percentage of errors of category									Number of responses		N/T
		TS	TV	TE	TH	TR	NC	NH	NP	NN	Group T	Group N	
12 (9)	V + Object	0	54	19	19	1	27	20	13	40	121	15	.12
(8)	V+ Modifier	10	66	2	2	0	14	43	0	43	113	7	.06
(11)	Complex	10	30	17	17	1	15	55	15	15	131	20	.15
9	V + Object	0	55	27	24	4	9	41	14	36	212	56	.26
	V+ Modifier	17	52	15	14	2	16	36	4	44	175	25	.14
	Complex	15	23	29	20	3	19	59	6	17	303	70	.23
F	V + Object	0	58	25	25	3	28	29	12	31	199	83	.42
	V+ Modifier	19	44	28	23	7	15	37	0	48	170	46	.27
	Complex	16	28	29	25	2	38	32	9	21	283	85	.30

The object position constrains the reader to remain within the theme, Group T errors, to a greater degree than either the subject position or the modification of the verb. Table 6.16 shows that this is a structural effect and not simply the result of position in the sentence. The structural effect is reflected in errors of syntax, category TS. When the constraint of the theme is removed however, object nouns are less easy to restore correctly within the sentence, category NC, for both groups of less fluent readers.

In verb phrases, Table 6.17, the simple verb plus object structure does not give rise to structural errors, category TS, as do the more complex phrases.

c Word level description : Dale-Chall rating

Table 6.18: Patterns of error related to Dale Chall rating

Group of Readers	Structure of Verb Phrase	Percentage of errors of category									Number of responses		N/T
		TS	TV	TE	TH	TR	NC	NH	NP	NN	Group T	Group N	
12 (45)	Common	7	47	34	10	2	64	15	8	13	440	142	.32
(10)	Known	0	54	29	7	10	68	7	20	4	94	44	.47
(5)	Rare	0	36	0	0	64	98	0	0	2	14	66	4.71
9	Common	11	37	30	16	7	42	26	11	22	825	264	.32
	Known	1	50	14	10	26	35	32	15	18	207	92	.44
	Rare	0	14	21	0	64	91	2	0	7	28	117	4.18
F	Common	12	35	26	21	7	41	20	9	30	729	371	.50
	Known	1	63	9	13	15	42	21	18	55	161	141	.88
	Rare	0	68	9	0	23	85	1	0	14	22	114	5.18

The table illustrates an increasing tendency to lose the theme of the text as the deleted word becomes less common. A very high proportion of responses to rare word deletions are however correct within the sentence.

The structural difficulty which gives rise to category TS errors appears to be distinct from the lexical difficulty of the deletion.

d Sentence level description

Table 6.19: Patterns of response related to sentence structure and sentence length

Group of Readers	Sentence length in Words	Percentage of errors of category									Number of responses		N/T
		TS	TV	TE	TH	TR	NC	NH	NP	NN	Group T	Group N	
12s	< 10	9	34	46	6	5	58	21	3	18	142	32	.23
	10-13	4	36	39	11	9	79	8	8	5	204	132	.65
	> 14	4	71	16	8	0	72	8	10	10	202	88	.44
9s	< 10	12	36	26	10	16	53	27	25	58	290	79	.27
	10-13	10	24	38	15	15	56	16	8	20	444	235	.53
	> 14	6	61	12	17	5	47	16	10	17	326	159	.49
Fs	< 10	13	44	16	15	12	52	26	4	18	271	143	.53
	10-13	8	24	38	21	9	53	11	10	26	370	291	.79
	> 14	9	61	6	20	4	42	18	12	28	271	192	.71
	sentence structure												
12s	S (35)	7	43	38	4	9	75	11	9	5	294	172	.59
	Cd (10)	7	40	22	30	1	80	2	5	11	117	40	.35
	Cx (15)	1	66	29	2	1	60	12	8	20	137	40	.29
9s	S	11	32	33	9	15	52	23	10	15	604	291	.48
	Cd	10	37	12	35	6	76	8	2	14	233	80	.34
	Cx	0	58	24	7	11	37	25	10	27	223	192	.46
Fs	S	12	38	28	12	9	50	17	12	21	506	406	.80
	Cd	10	38	8	37	6	60	7	0	32	240	83	.35
	Cx	0	53	24	12	11	41	19	8	32	166	137	.83

Both sentence length and sentence structure differentiate the response patterns of twelve year old normal readers from the other two groups. It is to be noted that this effect is more significant on simple and complex sentences than on compound sentences and on sentences of less than ten or more than thirteen words than on sentences of intermediate lengths. The compound sentences produced more errors of hesitation, TH, than other sentence types but also more errors which were correct within the sentence. Less fluent readers were less likely to make

errors unrelated to the theme on compound sentences. The figures relating to sentence length show that these effects are structural and not simply related to the size of segment processed.

e **Predictability and error patterns**

Table 6.20: Difference in patterns of error between items of high and low Predictability

Group of Readers	Predicta-bility	Percentage of errors of category									Number of responses		N/T
		TS	TV	TE	TH	TR	NC	NH	NP	NN	Group T	Group N	
12s(31)	High	3	57	21	8	10	76	6	11	7	134	123	.92
(29)	Low	6	45	34	11	3	72	13	4	11	414	129	.31
9s	High	3	44	26	10	17	57	11	13	19	319	210	.66
	Low	11	36	24	18	10	50	28	5	16	741	263	.35
Fs	High	4	54	14	16	11	56	9	13	23	280	309	1.10
	Low	12	37	23	20	7	27	43	24	6	632	317	.50

On items of high predictability the errors produced by all three groups of readers when constrained by the theme of the texts did not differ significantly; that is, on these items, a less fluent reader who was following the theme of the text behaved in a way which was not significantly different from a fluent twelve year old.

It was on items of low predictability that a significant difference was established between the errors of fluent twelve year olds and the other two groups.

f Summary of text features which affect responses on cloze tests

Table 6.21: Values of chi-square for factors in the text which cause changes in error pattern

a) Between groups of readers

Level of text	Factor	Values of chi-square for Group T errors between			Group N errors between		
		12s + 9s	12s + Fs	9s + Fs	12s + 9s	12s + Fs	9s + Fs
Discourse level	Narrative	40.3xxx	19.1xxx	14.1x	31.4xxx	15.1x	7.7
	Informative	33.5xxx	40.8xxx	3.8	74.0xxx	31.3xxx	22.6xxx
	Cohesive	10.9	31.8xxx	17.4x	8.7	14.3x	4.9
	Non-Cohesive	33.9xxx	36.3xxx	6.5	23.1xxx	30.7xxx	4.9
	Nuclei	38.0xxx	36.2xxx	12.7	22.1xxx	12.7x	8.0
	Catalysers	22.5xxx	44.6xxx	15.7x	7.2	17.5x	5.9
	Informants	1.7	5.4	4.5	2.6	10.8x	5.7
	Process Verb	12.1	35.3xxx	9.4	-	-	0
	Resultive Action	13.3x	11.1	4.0	-	0	18.8xxx
	Process. Object	6.3	-	7.3	2.8	12.0x	5.7
	Static Object	13.6x	14.6x	5.3	-	11.9x	1.1
	High Predict.	6.0	6.0	18.9xxx	14.2x	18.4xxx	1.3
	Low Predict.	41.9xxx	40.4xxx	3.7	16.1x	91.5xxx	75.3xxx
Sentence level	10 words	21.3xxx	42.1xxx	11.7	-	0.2	1.2
	10-13 words	15.5x	15.1x	11.0	20.3xxx	29.3xxx	4.4
	13 words	14.4x	27.3xxx	6.2	15.4x	20.7xxx	6.3
	Simple	21.2xxx	25.4xxx	17.1x	25.7xxx	33.4xxx	4.9
	Compound	8.5	16.0x	1.7	-	-	-
	Complex	16.9x	22.3xxx	-	4.9	3.7	1.3
Phrase level	NP before verb	1.1	-	3.4	2.6	12.5x	10.8
	NP after verb	18.9xxx	15.8x	6.2	14.7	30.0xxx	3.7
	NP subject	-	-	-	-	4.1	4.6
	NP object	-	-	-	-	-	8.1
	NP in modifier	-	-	4.8	4.0	20.3xxx	7.9
	Verb + object	-	5.7	0.9	-	-	6.2
	Verb + modif.	17.1x	44.9xxx	10.9	-	-	-
	Complex VP	4.9	9.4	6.6	-	-	10.3
Word level	Noun	16.7x	10.8	8.9	15.0x	42.6xxx	11.1
	Verb	23.1xxx	45.6xxx	10.8	0	1.7	13.8x
	Dale Chall Com	32.2xxx	54.2xxx	9.3	16.5xxx	22.2xxx	6.1
	" Known	14.4x	16.4x	9.4	16.7xxx	26.7xxx	15.8x
	" Rare	-	-	-	-	-	-
Subjects' rating Chapter 5	Item type 1	19.6xxx	41.9xxx	7.6	0	9.1	1.1
	Item type 2	35.8xxx	72.4xxx	25.4xxx	14.3x	19.0xxx	10.0
	Item type 3	7.1	23.0xxx	38.2xxx	33.7xxx	16.7xxx	14.0x
TOTAL		40.6xxx	56.0xxx	23.3xxx	33.4xxx	48.0xxx	9.4

Summary of Text Features (cont)

b) Within groups of readers

Level of text	Factors compared	Values of chi-square for Group T errors			Group N errors		
		12	9	F	12	9	F
Discourse	Narr./Informat.	8.8	40.3xxx	31.5xxx	1.1	10.8	10.7
	Cohesive/Non-C	19.3xxx	28.2xxx	50.8xxx	3.6	2.6	8.8
	Nuc./Cat./Inform	66.0xxx	89.4xxx	74.7xxx	38.2xxx	86.1xxx	112.4xxx
	Verb of Proc/R A	45.9xxx	47.0xxx	64.1xxx	-	6.0	5.8
	Process/Stat Obj	-	8.9	11.3	7.9	9.0	19.5xxx
	High/Low Predict	19.8xxx	34.6xxx	36.5xxx	7.7	22.9xxx	141.8xxx
Sentence	Length	79.6xxx	147.2xxx	145.3xxx	-	8.1	22.6xxx
	Type	104.0xxx	182.2xxx	110.4xxx	-	29.9xxx	24.0xxx
Phrase	Pos. Noun Phrase	-	9.6	15.4x	-	9.0	4.4
	Funct. Noun Phr	-	26.7xxx	32.3xxx	-	73.8xxx	63.1xxx
	Struct. Verb Phr	50.2xxx	106.9xxx	90.9xxx	-	-	14.8
Word	Noun/Verb	58.4xxx	183.2xxx	101.9xxx	74.3xxx	153.8xxx	75.0xxx
	Dale Chall rating	109.9xxx	156.7xxx	83.8xxx	-	94.1xxx	96.9xxx
Item Type assigned in Chapter 5		43.2xxx	37.1xxx	69.2xxx	7.2	7.1	22.2xxx

p = 0001 xxx
p = .01 x

- = frequency rating in some cells is too small for calculation of chi-square
Yates's correction has been applied

i Between group differences

Despite the high value of chi-square between the error patterns produced by normal nine year olds and failing twelve year olds of reading age nine, it can be seen that relatively few characteristics of the text contribute to this distinction. Differences between the two groups are significant on informative texts and on items classified as difficult, Type 2, or involving use of beyond sentence information, Type 3, relating to a less significant difference in performance on those items classified as 'cohesive' by the application of the system of Halliday and Hasan (1976). There is also a significant difference on items of high predictability, although neither group differed significantly from the more fluent twelve year olds on these items.

Differences between failing and normal twelve year olds are significant on all those factors which were used to investigate the

level of discourse except where semantic networks are created by verbs of resultive action. Informants, those portions of the text which are least important to its logical framework do not distinguish between groups of readers but the more important nuclei and catalysers do.

At the word level the less significant difference between the two groups on responses to nouns suggests again that the structural difficulties caused by the deletion of a verb are a major distinguishing feature between the two groups of readers.

The evidence of Table 6.3 has indicated that the less fluent readers are more likely to produce words of common occurrence but the values of chi-square show that Dale-Chall rating alone does not equalise the performance of the two groups; significant differences occur even on deletion of common words.

At phrase level, it seems that the modification of the verb is the only significant source of variation in performance between fluent and less fluent readers; this affects nouns deleted from modifying phrases as well as the verb deleted.

At sentence level, the evidence regarding compound sentences is noteworthy. While deletions from such sentences appear more difficult to restore than deletions from simple or complex sentences, the error patterns produced by the three groups of readers on compound sentences did not differ significantly. It is possible that the size and type of fragment requiring to be processed in a compound sentence minimises those syntactic structural factors which normally distinguish between the groups of readers, leaving difficulties of semantic and lexical origin.

Items of low predictability are again seen to differentiate between fluent and less fluent readers.

In general, it appears that those factors associated with reading failure, as reflected in cloze responses, operate at levels in the text higher than those of the word and the phrase.

ii **Within group differences**

Normal twelve year olds were unaffected by the difference between narrative and informative texts in terms of alteration of the error pattern produced. They were also unaffected by changes in the position and function of noun phrases. Like the other two groups they made no distinction between processive and static objects. All of the other factors investigated produced significant difference in the type of error response offered when the theme of the text was being followed, Group T responses.

Nine year olds were not affected by the position of the noun phrase but were affected by its function. Their responses when they were unable to follow the theme of the text, Group N errors, were also affected by many of the factors investigated.

Failing readers' responses were affected to a significant extent by all the factors investigated; more surprisingly their Group N responses, those unrelated to the theme of the text, were affected in nine of the fourteen comparisons made.

III SUMMARY OF CHAPTER SIX

The chapter analyses the responses of the three groups of readers qualitatively by categorising errors.

General findings are that nine year olds leave more gaps unfilled, 'zero responses', and that failing readers' responses are drawn to a greater extent than those of the other groups from words appearing on the Dale-Chall list of 769 words.

Twelve year olds are able to suggest more different responses per item on isolated sentences than the other two groups.

Errors are divided into words related to the theme of the text Group T errors, and those not so related, Group N errors. Failing readers are found to produce a higher proporton of Group N errors than the other two groups.

Within Group N, errors not related to the theme, responses are categorised according to the fragment of the text with which they are consistent. The categories in Group N are: correct within the sentence, NC; correct with regard to the preceding part of the sentence but not the following part, NH; correct within the phrase, up to three words on either side but no further, NP; and absolutely unconnected to the context, NN. Normal twelve year olds who lose the theme of the text tend to produce a response which is correct within the sentence, while failing readers are more likely to produce an unconnected nonsense response. Nine year olds are more likely to look at only the preceding part of the sentence.

Errors which are related to the theme, Group T errors, are categorised in terms of the behaviour which appears to have produced the error.

Errors of structure, category TS, appear to be produced either by the reader overlooking a small piece of visual information, faulty scanning, or failing to recreate correctly the local structure of the deletion, faulty chunking. These errors occur on only a small number of items. Errors of scanning are more common in the responses of failing readers, those of chunking in the responses of nine year olds. Twelve year olds produced very few responses of either type.

Errors of vocabulary, TV, are produced by failure at the purely lexical level; the response given is closely related to the correct response but not sufficiently close to be acceptable. More than a third of all errors within Group T were of this type.

Errors of expectation, TE, are produced by the reader creating an alternative scenario from that of the author. The response is syntactically and semantically 'correct' but does not restore the original meaning. Approximately thirty per cent of the Group T responses of twelve year olds and nine year olds are of this type but failing readers produce significantly less.

Errors of hesitation, TH, appear to be produced by the reader's not proceeding beyond the deletion in his search for information. Failing readers are twice as likely to produce an error of this type as are normal twelve year olds.

Random errors, TR, are produced by the reader recognising the

constraint of the theme but being unable to handle the local context. Any word related to the theme is inserted at random. Nine year olds are more likely than older readers to produce this type of error.

The patterns of error produced by the three groups of readers on specific groups of items within the test are then analysed. It is concluded that factors operating at word, phrase, sentence and discourse level cause the type of response offered to be altered. Major differences between failing twelve year olds and normal nine year olds are seen to be associated with their response to Informative texts and to those items which rely on the use of information from beyond the sentence.

There is no significant difference between the patterns of Group T errors produced by the three groups of readers in response to Noun deletions or to informants, those items which add details of time, place or manner to the main framework of the text.

The predictability of a deletion affects the type of response produced and items of low predictability distinguish between skilled and less skilled readers to a greater extent than items of high predictability.

These results relate only to the four texts used and to the specific items deleted from these texts but the contrast in pattern of error between the three groups of readers provides clear indications of the usefulness of the method for studying the interaction between the reader and the text.

CHAPTER 7: AN APPLICATION OF THE RESULTS OF THE STUDY TO A WHOLE SCHOOL POPULATION

The findings of Chapters 4 to 6 generated hypotheses which were tested by a large scale study involving the entire population of a secondary school, N=643, chronological ages from eleven to fifteen years. The purpose of the study was to make qualitative comparisons between good, average and poor readers throughout the age range in order to ascertain whether the failing readers' responses approached those of the good readers in later years.

I HYPOTHESES

i Relating to scores

1 Scores under both verbatim (V) and semantically-acceptable systems (SEMAC) will increase with age.

2 Distribution of scores will be sufficient to discriminate between good, average and poor readers throughout the age range of secondary education.

3 There will be a significant difference between scores on narrative and informative texts. Scores on narrative will be higher.

4 The effect of text type, narrative or informative, will be greater on younger and less fluent readers and will decrease with age and reading ability.

ii Relating to error responses.

1 Readers of the same level of reading ability will produce the same pattern of errors irrespective of age. That is, good readers at age twelve will produce the same proportion of errors of each category as good readers at age fifteen.

2 Readers of different levels of reading ability will produce different patterns of error responses. In particular:

a Poor readers will produce a higher proportion of responses showing changes in syntax from the original texts, (category TS).

b Poor readers will produce fewer errors of vocabulary, (TV), than good readers

c Poor readers will produce fewer errors arising from the generation of alternative 'scenarios' or expectations regarding the text than good readers, category TE errors.

d Poor readers will produce more errors arising from lack of use of following context(TH).

e Poor readers will produce more errors related to the theme of the text which show no connection to the local context (TR).

f Poor readers will produce a higher proportion of responses which are unrelated to the theme of the text, GROUP N errors.

g When working outwith the theme of the text, poor readers' responses will relate to shorter text segments than the responses of good readers, (error categories NC, NH, NP).

II METHOD

The continuous cloze form of the four texts used in the previous study with a standard twelve space gap to mark deletions was administered as a group test to each class of the first four years of a secondary school, S1, S2, S3, S4. The order of presentation of the four texts within the tests was varied.

All subjects completed the test in a forty minute period and were tested within three weeks of each other.

III SCORING

Initially the tests of all subjects were scored by the verbatim, exact-word, method. Those who scored less than ten out of sixty were excluded from the sample as the test was considered too difficult for them. It was also intended to exclude any who scored over fifty out of sixty, but as the highest score reached was forty-one, this limit did not operate.

Table 7.1: Verbatim scores: years 1 to 4

Year	N	Mean	S D	Number of subjects in score range						
				<10	10-14	15-19	20-24	25-29	30-34	>34
S1	210	24.0	6.3	3	16	27	62	60	36	6
S2	227	25.3	6.8	1	14	20	50	83	43	16
S3	206	27.4	5.8	2	4	13	39	76	52	20
S4	149	29.2	5.3	0	3	2	19	53	41	31
S1 - S3	643	25.6	6.3	6	34	60	151	219	131	42

The distribution of scores of fourth year subjects was found to be skewed. Study of absence figures for one week for S4 showed an average

of fifty three per day compared to less than twenty in years 1 to 3. Since fourth year pupils were streamed into Science/Language (academic) and General groups, it was possible to see that an average of forty-two of the 'general' pupils were out of school for a variety of reasons on any day. It was administratively impossible to test these pupils and, since they included many of the less-able readers, it was decided to exclude the fourth year from the study.

In years 1 to 3, the top, middle and bottom fifteen per cent, as identified by verbatim scores, were used as the basis for selection of groups of thirty good, average and poor readers in each year group.

The papers of these 270 subjects were scored by the semantically acceptable system, SEMAC, and their responses are analysed in the following sections

IV RESULTS

i Scores:

Table 7.2: Analysis of variance

a) Verbatim scores

Source	Sum of Squares	DF	Mean Square	F
Ability: A	8033.2	2	4016.6	914.04xxx
Age: Y	230.7	2	115.4	26.25xxx
Text type:T	18.2	1	18.2	4.13x
A x Y	50.7	4	12.7	2.89x
A x T	156.6	2	78.3	17.82xxx
Y x T	18.9	2	9.4	2.15
A x Y x T	22.9	4	5.7	1.30
Within group	2293.8	522	4.4	
Total	10824.98	539		

b) Semantically acceptable scores

Source	Sum of Squares	DF	Mean Square	F
Ability: A	11126.7	2	5563.3	824.9 xxx
Age: Y	594.7	2	297.4	44.1 xxx
Text type:T	1480.1	1	1480.1	219.5 xxx
A x Y	46.4	4	11.6	1.7 x
A x T	416.4	2	208.2	30.9 xxx
Y x T	42.8	2	21.4	3.2 x
A x Y x T	14.2	4	3.5	0.5
Within group	3520.3	522	6.7	
Total	17241.6	539		

x = .05, xx = .01, xxx = .001
t-tests between means were carried out to investigate the significant interactions shown above

Analysis of variance was carried out on both verbatim and semantically acceptable scores. A three way, fixed effects model with main effects of age, reading ability and text type was used.

The hypotheses regarding scores are confirmed by Table 7.2. Age, ability and text type all produce significant effects on cloze scores and there is an interaction between text type and the other two factors, although that between age and text type shows up only under SEMAC scoring. Interactions were further investigated by t-tests between means as shown in Table 7.3.

Table 7.3: Values of t between means

Group of Readers	Score Type	Value of t between means for Years					
		S1 and S2		S2 and S3		S1 and S3	
		Narr	Inform	Narr	Inform	Narr	Inform
Good	V	2.62	1.33	0.80	2.40	1.63	4.05xxx
	S	0.62	1.84	1.52	3.77xxx	2.31	5.45xxx
Average	V	0.58	1.42	1.71	1.69	0.87	3.32xxx
	S	1.52	1.66	2.70x	2.03	3.73xxx	4.61xxx
Poor	V	1.11	1.24	0.40	2.75x	0.96	4.89xxx
	S	0.78	0.49	3.45x	3.40x	2.82x	4.00xxx

DF = 58 .01 = 2.66
.001= 3.46

ii Error patterns

The error categories used are those defined in Chapter 6. Errors are divided into theme-related, Group T, and non-theme-related, Group N. Within Group N, errors are classified as either correct within the sentence (NC), correct according to only the preceding part of the sentence (NH), correct within the phrase (NP), or nonsense (NN).

Within Group T, errors are defined as errors of syntax (TS), vocabulary (TV), expectation (TE), hesitation (TH) or random errors (TR).

Other responses are classified as verbatim (V), semantically acceptable (SEMAC) or zero (Z). The twelve type classification system is used in the tables which follow.

Table 7.4: Number of responses of each category

		V	S	Z	Group T Errors					ET	EN	Group N Errors			
					TS	TV	TE	TH	TR			NC	NH	NP	NN
Narrative Texts															
Good	S1	477	226	1	12	42	100	27	2	183	13	9	0	2	2
Readers	S2	513	199	2	5	46	91	22	3	167	19	13	0	3	3
	S3	503	233	3	3	33	97	20	0	153	8	6	0	2	0
	Total	1493	658	6	20	121	288	69	5	503	40	28	0	7	5
Average	S1	381	213	9	24	58	107	44	11	244	53	27	7	10	9
Readers	S2	394	223	18	22	46	125	44	5	242	23	9	3	3	8
	S3	416	237	5	11	44	120	32	4	211	31	20	2	7	2
	Total	1191	673	32	57	148	352	120	20	697	107	56	12	20	19
Poor	S1	245	186	60	53	47	112	63	19	294	115	38	18	17	42
Readers	S2	226	192	112	36	52	107	65	10	270	100	54	9	11	26
	S3	287	214	16	39	54	116	54	9	272	111	63	11	12	25
	Total	758	592	188	128	153	335	182	38	836	326	155	38	40	93
Informative Texts															
Good	S1	523	118	11	18	75	86	13	0	192	56	16	10	28	2
Readers	S2	547	126	7	15	66	74	14	2	171	49	12	7	27	3
	S3	588	152	3	12	58	61	5	0	136	21	4	1	14	2
	Total	1658	396	21	45	199	221	32	2	499	126	32	18	69	7
Average	S1	377	109	20	15	102	111	32	6	266	128	26	29	47	26
Readers	S2	397	111	36	18	85	117	31	4	255	101	32	16	43	10
	S3	417	141	15	16	80	113	22	1	232	95	32	17	42	4
	Total	1191	361	71	49	267	341	85	11	753	324	90	62	132	40
Poor	S1	196	53	136	17	86	129	34	15	281	234	47	62	57	68
Readers	S2	219	44	212	13	85	109	28	22	257	168	34	34	59	41
	S3	273	78	42	20	109	126	37	10	302	205	48	44	67	46
	Total	688	175	390	50	280	364	99	47	840	607	129	140	183	155
Total Texts															
GOOD		3151	1054	27	65	320	509	101	7	1002	166	60	18	76	12
AVERAGE		2382	1034	103	106	415	693	205	31	1450	431	146	74	152	59
POOR	Total	1446	767	578	178	433	699	281	85	1676	933	284	178	223	248
	S1	2199	905	237	139	410	645	213	53	1460	599	163	126	161	149
	S2	2296	895	387	109	380	623	204	46	1362	460	154	69	146	91
	S3	2484	1055	84	101	378	633	170	24	1306	471	173	75	144	79

The values of chi-square show that the pattern of errors produced by readers of a given ability level when working within the theme of the text does not differ significantly with age. When working outwith the theme, the proportion of errors which are correct within the whole sentence (NC) produced by poor readers increases significantly with age and errors related to smaller text segments consequently decrease. A similar effect causes the overall pattern of errors of average readers to vary significantly with age. Hypothesis ii.1, that readers of the same level of reading ability will produce the same pattern of response irrespective of age, is therefore found to hold good only so long as the subjects are working within the theme of the text. With this reservation in mind, the ability groups, Good, Average and Poor readers, were treated as single units across the three years. Each ability group therefore contained ninety subjects.

Table 7.5: Proportion of responses in each error category

(Found by dividing the number in the column of Table 7.4 by the total number of errors in that Group, T or N)

Group of Readers	Group T errors				Group N errors				
	TS	TV	TE	TH	TR	NC	NH	NP	NN
G	6	32	51	10	0	36	11	46	7
A	7	29	48	14	2	34	17	35	14
P	11	26	42	17	5	30	19	24	27
S1	9	28	44	15	3	27	21	27	25
S2	8	28	46	15	3	33	15	32	20
S3	8	29	48	13	2	37	16	31	17

In Table 7.5, frequencies of response categories have been converted to percentages to show more clearly the differences between groups according to age and reading ability when working, outwith Group N, and within, Group T, the theme of the text. Table 7.4 shows that poor and average readers are consistently less able to remain within the theme than good readers. The hypotheses relating to patterns of error in ii.2 are all confirmed.

iii Text structure

Investigations of the relationships between responses and text structure, similar to those in Chapter 6, were carried out and are reported in Appendix II.

V DIAGNOSTIC ASSESSMENT AND REMEDIAL READING PROGRAMMES

i Test results

From two first year intakes, groups of children who experienced severe reading difficulty were identified by the Schonell R3 Silent Reading Test (Oliver and Boyd, 1961). The 1983 intake included those pupils who had been tested at nine years of age. Spearman's Rank Order Coefficient of correlation between forty subjects on the two testings at two and a half year interval on the cloze tests was 0.79, p=.005.

Table 7.6: Verbatim scores of S1 pupils

Year	Mean	S D	Number of pupils in range N						
			<10	10-14	15-19	20-24	25-2	30-3	>34
1982	24.0	6.3	3	16	27	62	60	36	6
1983	24.6	6.6	6	11	19	50	67	38	5

Table 7.6 gives the distribution, mean and standard deviation for each year's testing on the continuous cloze test. Table 7.7 gives Schonell Reading Ages, cloze scores and response profiles for the fourteen subjects who formed the group for the remedial programme described below. Line a gives the preliminary diagnostic test results, Line b, the results of the post-test carried out six months later. The final line of the table gives the mean result for first year pupils on entry to secondary education; it is equivalent in time to Line a.

Table 7.7: Diagnostic Profiles of Failing Readers

Pupil Number	Schonell Reading Age	Reponse Type V	S	Z	TS	TC	TV	TE	TH	TR	NC	NH	NP	NN
1a	8y2	9	5	5	3	0	3	7	2	4	3	5	2	12
b	9y11	10	3	15	3	0	5	8	5	1	3	3	3	1
2a	8y2	12	4	6	0	2	7	6	3	0	4	3	5	8
b	9y9	23	11	1	0	2	7	8	4	1	2	0	1	0
3a	8y2	12	6	0	2	2	6	8	4	1	5	4	5	5
b	9y5	17	9	0	0	2	9	9	6	0	3	2	3	0
4a	9y4	19	8	0	3	0	5	4	6	0	2	4	1	8
b	10y10	27	9	0	1	3	4	4	4	0	1	2	2	3
5a	8y2	13	3	21	0	2	4	3	4	0	2	4	1	3
b	10y3	15	4	15	1	2	0	6	4	0	2	3	1	7
6a	8y2	11	11	1	3	2	4	2	5	5	4	5	4	3
b	10y5	19	8	1	2	0	3	7	4	2	3	1	7	3
7a	7y6	13	5	0	3	0	7	3	8	4	3	6	2	6
b	13+	25	4	1	0	0	7	5	4	2	3	2	5	2
8a	8y7	17	6	1	3	0	4	5	4	3	5	3	4	5
b	10y3	25	7	0	1	0	5	8	6	1	0	2	4	1
9a	8y7	4	5	13	0	1	3	5	3	2	5	2	5	12
b	9y9	24	6	1	1	1	5	6	3	1	5	4	2	1
10a	8y7	4	6	12	1	1	2	4	3	5	4	3	2	13
b	9y5	21	6	6	0	1	2	6	6	1	3	2	1	5
11a	9y4	18	4	1	1	1	5	7	4	1	2	4	4	8
b	10y3	25	16	0	2	1	4	6	3	0	0	2	1	0
12a	8y7	11	9	0	3	2	6	4	6	0	9	2	4	4
b	11y4	22	11	0	1	0	5	7	5	1	3	2	3	0
13a	8y7	14	8	0	2	0	6	9	6	0	7	3	2	3
b	10y5	21	11	0	3	0	5	6	5	0	4	1	2	2
14a	8y11	16	10	5	2	0	3	7	4	2	3	3	3	2
b	11y4	25	11	1	0	0	3	7	3	2	2	2	2	2
Mean a	8y6	16	6	5	2	1	5	5	4	2	4	4	3	7
b	10y6	21	8	3	1	1	5	7	4	1	2	2	3	2
Mean S1	12y2	24	10	2	1	1	5	8	2	1	2	1	2	1

ii The remedial programme

Each pupil in the experimental group attended the Remedial department in a group of between four and ten pupils, for six forty minute periods a week. Reading activities took the form of oral reading of plays, one period; listening to a teacher read aloud stories and poems, one period; silent reading of fiction, one period and 'project work', involving higher order reading skills and library work, two periods. During these five periods no specific structured

intervention by the teacher was carried out. Incidental intervention in cases of difficulty was in the form of questions regarding the meaning of the text and directions to read ahead to the end of the sentence in order to identify the meaning of unknown words. Instructions to use phonic methods of word recognition were given rarely and only when meaning cues had failed to produce comprehension. In oral reading, errors which did not interfere with the meaning of the text were not corrected by the teacher.

The remaining forty minute period each week was devoted to specific activities related to error profiles. A subject was considered to have a difficulty in a specific area if he produced more than the normal number of errors of a given category produced by first year pupils plus two or more. In the area of syntax (errors of category TS), a pupil was considered to have a difficulty if he produced more than one error.

Errors of syntax were sub-divided into those produced by faulty scanning and those produced by faulty re-construction of syntax. These sub-divisions are labelled 'TS' and 'TC' respectively in Table 7.7. As with the basic classification scheme outlined in Chapter 6, there was a subjective element in this classification.

Exercises designed to improve scanning included proof-reading, computer programmes with a variety of rapid display reading tasks, and cloze exercises with small words or parts of words deleted. All served as the basis for group discussion after individual responses had been recorded.

'Chunking' exercises, designed to improve the recognition of phrase and sentence structure, took the form of correcting the order of words in sentences, elaborating and combining simple sentences and describing pictures on the basis of either the objects or the actions depicted. The terms 'noun' and 'verb' were used. These exercises were related to errors of categories TC and NP.

Errors of vocabulary (TV) and expectation (TE) were considered 'good' errors and no exercises were given to correct them.

Errors arising from lack of use of following context, (TH and NH) proved more difficult to correct. Cloze exercises with deletions dependent on information from the following part of the sentence were the only material used.

Errors which were correct within the sentence (NC) were related to a variety of exercises designed to increase the ability to treat the text as a whole. Group prediction, sequencing and cloze exercises with deletions dependent on information from beyond the sentence were designed to establish the use of between sentence connections. Paragraph titling and summarising were intended to improve identification of important information in texts.

Nonsense errors (NN) and random errors (TR) were considered as 'frustration level' responses arising from a combination of difficulties and no specific exercises were designed to correct them.

Each pupil took part in exercises of all types related to his error profile as shown in Table 7.8.

Table 7.8: Diagnostic assessment of individual pupils

Pupil Number	Improvement in R A (months)	Cloze Score	Area to be improved Scanning	Chunking	Discourse level cues	Following Context
1	21	1	x			x
2	19	11		x	x	
3	15	5	x	x	x	x
4	18	8	x		X	x
5	25	2		x	X	x
6	27	8	x	x	x	x
7	60+	12	x		X	x
8	20	8	x		x	x
9	14	20		x	x	
10	10	17			x	
11	11	7		x	X	x
12	33	11	x	x	x	x
13	22	7	x		x	x
14	33	9	x			

iii Discussion

The results in line b of Table 7.8 indicate that measured reading age had increased by an average of twenty-four months over the six months of the programme. Previous remedial groups in the school had been tested only at yearly intervals; the mean improvement for the three previous year groups over a twelve month period was twenty-two months. The six months of the experimental programme had apparently produced a greater increase in reading age than previous whole year programmes conducted by the same teacher with similar groups of pupils but this difference was not statistically significant.

The main difference in the teaching during the earlier years had been the inclusion of specific phonic programmes and reading laboratory material. Pupils had normally spent two forty minute periods per week on activities of these types. The poor readers tested in S2 and S3, see above Table 7.4, had taken part in such programmes. The change in error profile produced by the experimental programme would appear to

to be the main difference in result from the earlier programmes. Poor readers taught by the previous method had retained the 'failing' error profile till age fifteen, those taught by the experimental method changed their error profile to one more closely resembling that of the normal first year pupil. Longitudinal studies will be necessary to ascertain whether the change is permanent. Some light is cast on this by a follow up study reported in Appendix IV which was carried out after the main research was completed.

The main difference remaining after the six months programme between the experimental subjects and normal readers was in their tendency to make less use of following context. Since cloze exercises had played a large part in the programme, this may be due to the lack of variety of exercises designed to overcome this difficulty.

VI SUMMARY

The whole population of a secondary school was tested with the continuous cloze form of the four texts used in Chapters 4 to 6. Mean score under the verbatim scoring system increased wih age. Papers of the top, middle and bottom fifteen per cent of each year group were scored by the semantically acceptable system and an analysis of variance with fixed effects of age, reading ability and text type showed that all three main effects were significant and that there was a significant interaction between both age and text type and ability and text type.

The error categories which were related to the theme of the text produced a pattern of responses for each ability group which did not

alter significantly with age. Errors which were not related to the theme showed poor readers improving in their ability to deal with complete sentence units.

The pattern of errors produced by failing readers in the previous study was reproduced by poor readers and differed significantly from those produced by good and average readers. Poor readers appear to lose the theme more often than other groups and base their responses on smaller text segments; they make more 'nonsense' responses than other groups. When working within the theme, they produce more errors of syntax than either good or average readers; errors of hesitation and random errors are produced in inverse relation to reading ability.

The features of texts which affected response patterns in Chapter 6 were again found to have a significant effect on responses.

The error profiles of a group of failing readers were used as the basis for diagnostic assessment and remedial reading programmes. Over a six month period, a mean improvement in reading age of twenty-four months was produced and the mean error profile of the group became closer to that for normal readers of the same age. This contrasted with the effects of previous remedial programmes which produced a mean improvement of twenty-two months over a twelve month period but did not significantly alter error profiles.

CONCLUSIONS REGARDING HYPOTHESES

From Chapter 7:

Hypothesis i: 1. Scores under both verbatim and semantically acceptable systems will increase with age: Confirmed.

Hypothesis i: 2. Distribution of scores will be sufficient to discriminate between good, average and poor readers throughout the age ranges of secondary education: Confirmed.

Hypothesis i: 3. There will be a significant difference between scores on narrative and informative material; scores on narrative will be higher: Confirmed.

Hypothesis i: 4. The effect of text type will be greater on younger and less fluent readers and will decrease with age and reading ability: Confirmed.

Hypothesis ii: 1. Readers of the same level of reading ability will produce the same pattern of error responses irrespective of age: Confirmed for Good and Average readers; Poor readers improve in their ability to process complete sentences.

Hypothesis ii: 2. Readers of different levels of ability will produce different patterns of error responses: In particular:

a Poor readers will produce a higher proportion of responses showing changes in syntax from the original text: Confirmed.

b Poor readers will produce fewer responses of purely lexical origin: Confirmed.

c Poor readers will produce fewer responses arising from the generation of alternative hypotheses about the text: Confirmed.

d Poor readers will produce more errors arising from lack of use of following context: Confirmed.

e Poor readers will produce more errors related to the theme of the text but not related to local context: Confirmed.

f Poor readers' reponses will show them to be working outwith the theme of the text more frequently than normal readers: Confirmed.

g When working outwith the theme of the text poor readers' responses will show them to be working with shorter text fragments than good readers: Confirmed.

Hypothesis iii: 1. Items which have been shown to be easy to restore on the basis of within sentence information, those which are difficult to restore on the basis of the total text and those which require the use of information from beyond the sentence will cause different error patterns: Confirmed.

Hypothesis iii: 2. Narrative and informative texts will produce different error patterns: Confirmed.

Hypothesis iii: 3. Discourse structures as reflected in the systems of cohesive ties and semantic networks will cause different error patterns: Confirmed.

Hypothesis iii: 4. Variation in logical importance of units of text will cause differences in error pattern: Confirmed.

Hypothesis iii: 5. Nouns will cause different error patterns from verbs: Confirmed.

Hypothesis iii: 6. Variation in phrase structure will cause different patterns of error: Confirmed.

Hypothesis iii: 7. Dale Chall rating (Common, Known or Rare word), will affect error patterns: Confirmed.

Hypothesis iii: 8. Sentence structure and sentence length will cause variation in error pattern: Confirmed.

Hypothesis iii: 9. Predictability of the deleted word will cause variation in error pattern: Confirmed.

CHAPTER 8: DISCUSSION AND CONCLUSION

By relating the findings of this study to the discussion of reading failure in Chapter 1, it is possible to suggest changes in remedial and primary reading programmes and to indicate possible factors associated with reading failure which might be investigated in future research projects. The contribution of text structures to reading difficulty for readers of different ages and levels of ability may also indicate areas for both research and the improvement of reading teaching.

1 READING FAILURE IN THE SECONDARY SCHOOL

The contribution to reading failure of the various components of the reading process discussed in Chapter 1 is outlined here. The diagnostic results given in Chapter 7 have shown that the nature of reading failure is not uniform; the description given here is, therefore, to be seen as a generalisation. Individual differences, and the resulting variation required in remedial programmes, are discussed in Section III of this chapter.

i Scanning

Failing readers' difficulties in this area were apparent first in the problems with gaps at the ends of lines in Preliminary Study 1. Location scores which must be related in part to scanning did not however distinguish between failing readers and nine year olds. Errors of local structure (category TS) were shown to consist of

errors of both scanning and chunking. Errors of scanning were shown to be localised to six of the sixty items and to be related to the overlooking or misreading of small pieces of visual information (less than five print spaces) or to the assumption of the presence of such pieces of information. Despite this localisation failing readers made twice as many errors of scanning as nine year olds and four times as many as normal twelve year olds. The visual problems described by Grant (1981) do not therefore appear to have affected all the test material. Individual profiles of failing readers show that they do not all experience such difficulties.

One of the difficulties in using the cloze procedure is that it may interfere with normal scanning either by the physical presence of a deletion acting as an automatic 'stop' sign, by breaking up local structures which help govern eye movements or by adding to normal reading behaviour a problem solving element which occasions closer visual sampling of the text. Cloze procedure may lessen the effects of scanning problems which occur in normal reading. For this reason, the occurrence of scanning problems in failing readers on cloze tests is significant as is the size of text unit involved. The idea that failing readers pay too much attention to the visual detail of the text discussed in Chapter 1, would appear to be an incorrect generalisation.

Kolers (1970) showed that poor readers between the ages of ten and fourteen used frequent guessing and paid less attention to the printed stimulus in experiments with normal and reversed type. He concluded that poor readers were relying more on their top-down processing of the language than on visual input. It is possible that this fluent

but inaccurate style has developed in response to the type of visual difficulty suggested by the findings of the present study. Since normal readers improved in scanning between the ages of nine and twelve, it must be assumed that during this period they were learning to control the visual processing component of reading among others. Since failing readers at this stage were not sufficiently fluent to read extensively, they may not have learned this control. It is significant however, that errors of scanning occurred more frequently on the more familiar narrative texts than on informative material.

The fact that reading may be affected by the physical layout of the text was investigated in Preliminary Study 1 and in location tasks. No significant effect was found of line length, spacing or presence of a physical gap in the test. The difficulties of scanning may however have contributed to the decrease in scores between isolated sentence and continuous presentation in Preliminary Study 3. The presence of a large body of text may distract the eye from processing the present line efficiently, line ends being particularly affected. Willows (1974) inserted phrases related to the theme of the text in red between the black printed text lines; she found that this affected the oral reading of poor readers and caused them to make more errors on subsequent multiple choice answers which included the red phrases. This would appear to indicate that good readers are able to cope with the linear processing of print in the presence of distractions and that they obtain more information from 'peripheral vision' than do poor readers. Scanning difficulties of the latter group may be related to the linear sequential nature of print.

The use of information from following context may also be related to

eye-movements. Errors of hesitation, categories TH and NH include responses which took account of up to three words of following context; two items which less skilled readers found easy to restore despite their low predictability were cued within the same range. Since their general lack of use of following context suggests that the deletion point was used for fixation, this would indicate that even poor readers were able to use information from beyond the fixation up to a distance of twelve letter spaces. Normal twelve year olds were able to restore eight items of low predictability which were cued within one sentence; that is, they used a wider range of following context. They may however have made more than one fixation in obtaining this information.

The distance of the cue from the deleted word in following context which made restoration difficult was six words or more for average or poor readers and eight words for good twelve year olds. For nine year olds it was seven words.

In Preliminary Study 1, cue ranges for easy and difficult items showed that, while form class was almost always cued within a five word segment, deletions which had their meaning cued within the preceding four and following one word were easy to restore. Difficult deletions had cues in the preceding three or following four words.

Also relevant to this point is the finding of Bruner and Potter (1964) that more information is required to disconfirm a hypothesis than to recognise a picture about which no hypothesis has been formed. Fluent readers are generating hypotheses about the semantic and logical development of the text and therefore pay more attention to those

areas of the text from which important visual information is to be obtained. They are less concerned with details of time, space and manner supplied by informants and are less dependent on visual information from these parts of the text. They make more errors of scanning and chunking on informants than on other parts of the text. It is important to note that nine year olds and failing readers also appeared to be functioning more effectively in scanning and chunking on nuclear functions than on informants, but unlike the twelve year olds, they did not distinguish in this component of reading between unimportant details presented in informants and the more important additions to the text presented in catalysers.

The visual component of the reading process is thus seen to be controlled by higher levels of processing which may be syntactic, semantic or logical; even in purely visual tasks failure may therefore be associated with these higher levels as well as with purely physical visual problems.

The major finding in this area is the difficulty associated with short word processing. Those failing readers who experience difficulties with scanning are liable to be affected by short words in text; it has generally been assumed on the basis of oral reading that longer words were more difficult. While this may be true at other levels of processing, the importance of early remedial programmes designed to correct the visual processing of small words and punctuation marks in silent reading has been strongly indicated by this study.

ii **Word recognition**

No evidence has been presented in this thesis regarding the question of how words in print are related to meanings in the lexicon. Lip and throat movements have been observed in some failing readers indicating the presence of vocalisation and subvocalisation, with 'sounding out' being the predominant word attack strategy. The absence of such evidence for other groups of readers need not indicate that inner speech is not used in translating print into meaning.

Decoding difficulties were assessed directly in Preliminary Study 1. Word recognition accuracy was found to correlate highly with cloze performance and with reading age. The texts chosen restricted the decoding difficulties by restricting vocabulary to the range expected from readers functioning at the nine-year old level.

Restricted lexicon has been shown to be reflected in the responses offered by failing readers on cloze tests; seventy four per cent of their responses were words which appear on the Dale-Chall list of 769 words. This compared unfavourably with the range of responses offered by nine year olds. The normal twelve year olds offered a significantly wider range of responses than either group. Since many failing twelve year olds seem to be able to express themselves orally in a variety of situations, it may be that the lexicon produced on cloze tests is specific either to the cloze procedure or to the reading situation.

The extra difficulty of lexicon search in the absence of visual information, as demanded by cloze tests, may be proportionately

greater for failing readers either because they have less context available in their visual field or because they are more dependent on visual information or because their search procedures are less efficient.

Mackworth (1972) found that failing readers took longer to complete a sentence with a word from a given list than did normal readers and that they looked twice as long at words of the wrong form class. When the lexicon search was restricted, and based on visible words, failing readers made less effective searches. Cunningham (1978) found that results for limited cloze tests, that is cloze with the deleted words provided at the top of the passage, correlated highly with normal cloze scores; the provision of the words did not have a different effect on good and poor readers. He concluded that limited cloze was a reliable and valid test giving higher scores than normal cloze. Baldauf and Morley (1979) have found this technique to be valid in assessing slow learning children.

Since lexicon was a major factor differentiating the responses of failing from normal readers in the absence of any visual cue, the organisation of lexicon search may be a contributory factor to success in reading.

iii Chunking

Forster and Olbrei (1973) claimed that there must be a psychologically real level of description which is purely syntactic. If such a level exists there has been no evidence for it in this study; difficulties of syntax have been associated with semantic difficulties wherever they have occurred. Normal twelve year olds were shown by form class

scores to have an almost complete control of the relatively simple sentence structures of these texts. Failing readers and nine year olds were less able to deal with complete sentences but continued to improve in this respect, in the case of failing readers throughout the secondary school age range. Approximately seventy per cent of all responses in all studies were of the correct form class, a figure similar to that obtained by Clay (1968) in the oral reading errors of five to six year olds. Where the errors were not of the correct grammatical form class this could be attributed in the majority of cases to faulty scanning or lack of use of following context.

The real errors of chunking shown in Table 6.7, occurred only three times. Nonsense responses and random responses may also reflect structural difficulties of local origin or may be frustration level responses where greater than usual semantic difficulty exists.

Responses which are correct within the phrase and the evidence from Preliminary Study 1 concerning cue range indicate that chunking may be on the basis of a five word segment as suggested by McGinitie (1961). The lack of use of following context to locate phrase boundaries would suggest that the cloze procedure is obscuring phrase markers for failing readers and that the five word segments may be created in response to deletion sites.

The importance of phrase boundaries in the perception of language has been shown by 'click location studies' (eg Fodor and Bever, 1965)) who found that the subjects recorded the position of a click superimposed on oral language nearer to the nearest phrase boundary than its actual

occurrence on sixty-six per cent of occasions on which they made errors. Francis (1972) asked children between the ages of five and seven to stop at the point where it was easiest to do so; most separations occurred after nouns or verbs or the word 'not'. If the failing readers are chunking in the same way as the younger children are and not on the basis of phrase boundaries, the removal of nouns and verbs would have a greater effect on their text processing than on that of more fluent readers. Five word segments may be equated for the fluent reader with phrases. The length of noun phrase and of two thirds of verb phrases in the texts used in this study woud allow boundaries to be recognised within such segments.

If, however, the five word segment is being created by the deletion site and the preceding four words, the increased incidence of errors of hesitation is explained. If this is the case, there exists a very basic difference in cloze processing between good and failing readers. The evidence has shown that phrase structure rather than length is a correlate of difficulty. Depending on the position of the deletion the preceding four words may or may not cross a phrase boundary making the structure more or less difficult to recreate. Epstein (1967) conducted a study in which he marked phrase boundaries correctly in one set of material and placed markers at the same ordinal positions which did not co-incide with phrase boundaries, in another. He found that undergraduates found the correctly chunked mterial easier to learn than unmarked material and the incorrectly chunked material more difficult. Even at a fairly sophisticated reading level, distraction from phrase structure created difficulty.

Gladney and Krulee (1967) also found that syntactic errors inserted

at phrase boundaries in an eight word sentence disrupted the recognition time significantly. If, then, the effect of cloze deletions is to violate phrase structure and conceal phrase boundaries, the task which is being performed by the failing reader is a syntactically more difficult one than that being performed by the good reader who is able to recognise the phrase structure either from his own superior linguistic knowlege or from the wider range of visual information of which he is aware.

The functionally complete sequences defined by Carroll (1978) at this level are therefore basically different for the two groups of readers. The good readers are creating a series of phrases which can be transformed into a sentence at either surface or deep structure level. The failing readers are carrying out a linear rather than a hierarchical process.

The importance of the verb in either system is paramount. All groups found verbs more difficult to process than nouns but failing readers were more affected than nine year olds by the type of verb according to Frederiksen's semantic classification system. Semantic networks involving verbs of process were more difficult to re-create than those involving verbs of resultive action. The simplistic syntactic analysis of the difficulty in restoring or locating verbs has been called into question by Fodor, Garrett and Bever (1968) who suggested that the lexical analysis of the verb determined possible relationships with other constituents, Fillmore (1968), who stated that the verb was the pivot around which units of meaning revolve, and Thorndike (1975) who found that verb imagery value co-incided with reading time for sentences. That is, the meaning of the verb which

contributed in some way to the syntactic structure, was more important that the syntactic structure itself. Riesbeck and Schank (1978), in constructing a linguistic computing device, concluded that 'separate syntactic processing cannot reasonably occur'. The results of the studies reported in this thesis support the view that it is the meaning of the verb which correlated with reading difficulty and that the syntactic difficulty arises because of the essential grammatical correlates of certain meaning functions.

The importance of the sentence as a unit of chunking has also been indicated by this study. Difficulty in re-creating phrase structure as experienced by failing readers makes it more dificult for the products of phrase processing to be successfully combined into sentences.

The difficulty of failing readers in processing the sentence structures associated with printed language cannot be ascribed entirely to the weaknesses in processing at visual levels . Bormuth (1966) found that poor readers' comprehension of printed material was improved when the sentence structure resembled that of spoken language. Smiley et al (1977) found that poor readers' comprehension of a story was not improved by having it read to them. Killey and Willows (1981) found that poor readers had difficulty in pin-pointing errors in orally presented material. These results would suggest that it is an unfamiliarity with the specific structures used in printed language, rather than a difficulty with reading as a particular mode of language use, which creates some of the problems of the failing reader.

If, then, the failing reader is faced with the task of re-creating

phrase structure on the basis of incorrect recognition of phrase boundaries and of combining the incorrectly formed phrases into sentences with whose structure he is unfamiliar, it could be argued that he is facing syntactic difficulty of a different type from the fluent reader who is able to recognise phrase boundaries and is familiar with the sentence structure of printed language. Since the degree of difficulty depends on the semantic nature of the verb and its associated network, the capacity of the verb to generate an image or to access strong verbal asssociations may determine how difficult the task becomes and whether or not the syntactic difficulty is overcome. The lexical content and semantic structure of the verb and its associated network appear to be more important than syntactic structure in determining difficulty in the 'chunking' component of the reading process.

iv The interaction between the reader and the text

Only three factors operating below discourse level significantly distinguished the error patterns of failing readers from those of nine-year olds. Two of these affected the groups differently only when they had lost the theme of the text. The third, on increased difficulty in sentence processing on compound sentences for failing twelve year old readers and a significant difference in error patterns on simple sentences between the two groups, reflects the greater linguistic maturity of the failing readers. Differences between normal and failing twelve year olds also tend to be more frequent when discourse level factors are analysed; phrase length and structure of noun phrases does not create significant differences between the two groups. Reading failure must therefore have a considerable component

arising from factors operating at stages of the reading process 'above' that of chunking in the interaction between the reader and the meaning of the text.

a) Hypothesis generation

The constructive component of the reading process was reflected in errors of expectation and in the number of alternatives offered in the completion of isolated sentences. Both showed failing readers to be generating fewer verbal hypotheses than normal twelve year olds.

The importance of the type of semantic network being processed for hypothesis generation suggests that both semantic structure and lexical content of the verb are critical factors in reading failure. The relationship between these two factors and the capacity of the text to generate an image which is an accurate representation of the meaning of the text may be related to the findings of Riding and Anstey (1982) who found that children who relied on imagery as opposed to verbal association in reading were less accurate and comprehended less than others. Thorndyke's (1975) finding that verb imagery value correlated with sentence reading time to a greater degree than sentence complexity would suggest that all readers are affected by imagery values in texts.

In defining the two types of network, Frederiksen (1975) states that the network for a verb of process need contain only a 'patient' which is undergoing physical change, 'a processive object' and a process. In normal subject-verb-object order the reader, having encountered a subject and a verb would be justified either in regarding the

information structure as complete and forming a 'hypothesis' (Woods, 1980), or in regarding all the slots in the 'scenario' as filled (Sanford and Garrod, 1981). Modification coming after the verb could be ignored. If a hypothesis was formed at this stage and the later modification of the verb provided information which disconfirmed the hypothesis, it would be more difficult for the reader to change the hypothesis than it would be to create a new hypothesis when none had been formed; Bruner and Potter (1964) and Pearson and Studt (1975) provide evidence that this is the case and that failing readers are less likely to change their hypothesis than normal readers. In the 'scenario' view of the reading process all the slots in the scenario which could be designated 'obligatory' would be filled and there would be difficulties in accommodating new information.

The more complex network associated with a verb of resultive action contains more 'slots'. Subject-verb-object order under this system would require the reader to wait until the object slot was filled and the need for use of later parts of the network would be evident. If we are to accept that failing readers are more likely to form pictorial images in order to interpret text, the image would not be formed until all relevant information had been processed. The fact that all groups made more errors involving lack of use of following context on verbs of process than on resultive actions supports this interpretation. (Table 6.12 and 7.10, errors of categories NH and TH). Verb phrases in which modifiers were present distinguished significantly between normal twelve year olds and both nine year olds and failing readers in patterns of response related to the theme, particularly in an increased number of errors of syntax. This would indicate that structural difficulties are experienced by less fluent

readers at this point and support the view that it is the structure of the semantic network expected by the reader which determines some of the difficulties associated with hypothesis generation and scenario refinement.

In the system of description employed by Trabasso (1972) the readers would have encoded the information from the text into an internal representation on the basis of incomplete evidence.

Differences in processing between normal and failing readers in this component of the reading process are therefore the recognition of fewer possible developments of meaning in the text, the creation of hypotheses at too early a stage in the processing of a given semantic structure and a greater degree of rigidity in maintaining the hypothesis and in refusing to accommodate later information from the text.

Gough's view (1972) of the reading process as a letter-by-letter plodding through the text does not appear to be a satisfactory description of the processing of text as reflected in the responses of any group of readers. All readers generated expectations regarding the texts and took account of structures within and beyond the sentence in making their responses. If Gough's view had been correct all errors would have ignored following context. It may however be argued that the behaviour exhibited in a cloze test is conditioned by the reader's awareness of the need to seek out information on which to base his response. The fact that different groups of readers sought out different information would be an argument against the single phonological view expressed by Gough but could be accommodated within

a constructivist view of the reading process. Olshavsky (1976) reported that only one reading strategy above word recognition level, as reported by fluent readers at age fifteeen to sixteeen, was text dependent; this was the reading of the clause. Table 8.1, p 235, reflects this distribution. Difficulties with compound and complex sentences may be ascribed to the clause level and differences caused by phrase structure to the semantic network described above; the major differences between normal and failing readers are at higher levels. While difficulties in scanning, word recognition and chunking make a contribution to reading failure, there is also a significant contribution from non-text dependent factors.

b) The contribution of the reader to the re-construction of the text

Having argued that failing readers are engaged in a constructive interaction with the text, it is necessary to examine the evidence regarding how they fail to make an adequate reconstruction. In forming and in refining or disconfirming hypotheses, the characteristics of the reader which contribute to success are background knowledge, cognitive processing and previous linguistic experience. The texts used were chosen to minimise differences between groups of readers on the basis of background knowledge and differences in processing may be assigned either to linguistic experience or cognitive processes. Factors of interest and motivation may have produced different effects but the low number of zero responses from the failing readers and the fact that they attained a meanscore of twenty-five out of sixty under SEMAC scoring would suggest that they were making considerable efforts to complete the tests.

i Within sentence processing

The fact that normal twelve year olds were able to complete twenty-three of the sixty items on the basis of within sentence information must be the starting point for a study of differences in linguistic experience between the two groups. Normal twelve year olds were aware of the importance of the sentence as a unit of text and looked ahead to the end of the sentence, or were aware of the rest of the sentence in peripheral vision, before restoring a deletion. Items which were more easily restored within the sentence were catalysers, nouns coming after the verb, verbs rather than nouns, words which were on the Dale Chall list of 769 common words, words in simple or complex sentences, and words which were highly predictable.

a) Catalysers are involved in the recognition of the relative importance of different text segments (Barthes, 1980). Twelve year olds were better able to differentiate between points which were constrained by the logical development of the text (catalysers) and points at which such constraint was weaker and open to change (nuclei). They required information from beyond the sentence in the restoration of nuclei but not of catalyzers. Failing readers could not make this distinction. Nine year old normal readers appeared to be already aware of the importance of nuclei and the distinction cannot therefore be regarded as having developed with practice in reading after the age of nine. The normal reader at age nine seems to possess a capacity which some failing readers have not developed by age fifteen. The ability to focus explicitly on foreground has been studied by Smiley (1978). Beginning readers were shown by him to be unable to differentiate

between important and un-important units in texts but older failing readers were shown to have equal difficulty in making the distinction when the material was presented orally. It is suggested here that cognitive style may have some relevance to this issue. In order to create a verbal schema in memory, deep structure relationships must be clarified and, in reading, only sufficient processing capacity is available in short term memory for important units of meaning to be carried forward.

b) Recognition of verb structure and the capacity to envisage all possible slots in a network has already been discussed. Networks in speech are of similar deep structure to those employed in print but surface structure differences are significant. Weaver (1965) suggested that structural redundancy was higher in reading than in listening and the capacity to process the redundant elements may develop with practice in reading: nine year olds and failing readers were equally affected by differences in verb networks. This aspect of reading failure may then be ascribed to general lack of practice in reading.

c) Lexical distinctions between good and failing readers as reflected by the Dale Chall rating of responses have already been ascribed to difficulties associated with lexicon search rather than lexicon size. Since normal twelve year olds were able to supply the common words more easily than less commmon deleted words, it would appear that they are still affected by this factor. Although good readers in the secondary school were not affected by Dale Chall rating of deletion in terms of level of difficulty, they did

produce more errors of hesitation, lack of use of following context, and fewer of vocabulary on the five deletions which do not appear on either Dale Chall list. Lexicon search for cloze purposes may continue to develop throughout the secondary school age range.

d) Predictability, while it is related to redundancy, also reflects the reader's ability to make an accurate prediction on the grounds of all the information that has gone before and of his previous experience. Low predictability was overcome by normal twelve year olds on only eight of the twenty-nine items of Low predictability. In each of these cases the following context required was within the sentence. There was no evidence of these readers using information from following sentences. Evidence regarding predictability would therefore reflect the ability to carry forward important information from preceding sentences and the ability to process the sentence as a unit. Since these words were more easily processed on the basis of within sentence information than others by normal twelve year olds, the sentence itself must contain a significant part of the information required for prediction. It is suggested that the 'scenario' associated with the verb carries this information.

The factors which contributed to ease of restoration within the sentence for normal twelve year olds may therefore be associated with only three factors; efficiency of lexicon search, re-creation of verb networks, and recognition of relative importance of units of text. The first two may be regarded as components of linguistic experience and have been shown to continue developing

in normal readers after the age of nine but not to develop adequately in failing readers by age fifteeen. The logical ability to distinguish levels of importance of text units was however, already established in normal readers by age nine and may reflect a cognitive rather than a linguistic difference between good and poor readers.

ii Beyond sentence processing.

Items which lead normal twelve year olds to use information from beyond the sentence are narrative text type, presence of a specific cohesive tie, nouns, high predictability items and sentence types other than complex. Neither group of less skilled readers was affected in this respect by text type or sentence structure. Failing readers were more dependent on specific cohesive ties than the other two groups. The linguistic experience of the twelve year olds had therefore been influenced by familiarity with narrative texts between the ages of nine and twelve, leading to fluency in the fairly restricted between sentence connections involved in simple narrative. Since the ability to deal with complete simple and compound sentences had been established, the readers could relate such sentences to others. The control of subordination had developed only to the point at which information from the immediate sentence was available for processing in complex sentences.

The number of items on which nine year olds used information from beyond the sentence was significantly higher than the other groups, indicating that normal readers passed through a stage in their reading development at which they recognised the need to make between sentence

connections. The reliance of failing readers on specific semantic structures suggests that they make use of such information more frequently when the need to do so is specificaly signalled by the text. In the absence of such signals they will, if they have succeeded in re-creating the verb network, fill the noun slots in that network with any noun suitable to the immediate context without reference to information from other sentences.

The linguistic experience deficits of failing readers are: the restricted range of lexicon used and the lower efficiency of lexicon search; lack of ability to re-create the structure of verb networks; the reliance on specific signals in the text before using information from beyond the sentence. Aspects of their apparent failure which may be attributed to their general stage of reading development are also those in which they resemble nine-year olds: inability to deal with complete sentences; restricted use of following context; difficulty in restoring verbs of process and nouns coming before the verb.

The reader's contribution to the re-construction of the text is seen to consist of cognitive and linguistic components. The failing reader is linguistically retarded in his ability to deal with complete sentences, to restore semantic networks dependent on verbs of process, and to make use of following context.

Linguistic areas which cannot be described as suffering from simple retardation are the very restricted lexicon used in cloze responses and the dependence on specific semantic cues in the text for the use of information from beyond the sentence.

A cognitive deficit is apparent in the inability to distinguish those elements of the text which are more important than others to its logical development.

v Areas contributing to reading failure

In Chapter 1 it was suggested that variation in the nature of reading failure might be occasioned by the interaction of difficulties of four types: language, visual, auditory and cognitive deficits. No evidence has been sought in this thesis regarding auditory processing but the interaction of the other three factors was indicated in the results of this investigation.

a) Visual difficulties: These are apparent in errors of scanning and location and in handling gaps at ends of lines. Failing readers as a group show a significantly larger number of such errors than other groups.

b) Language difficulties: The language difficulties of failing readers must be divided into those in which they resemble other readers of equivalent reading development, normal nine year olds, and those which are specific to failing readers. The difficulties of 'chunking', that is of dealing with local structure, may be assigned to the first category, that reflecting a reading age of nine years; the development of syntax has been shown to continue until age thirteen (Palermo and Molfese, 1972). For all less fluent readers, lack of familiarity with the structures used in printed language may contribute to this difficulty. The cloze procedure may also increase difficulty in this area by causing the reader to impose an erroneous set of phrase boundaries to co-

incide with the deleted words; the lack of use of following context may be partly ascribed to this cause.

Difficulties not shared with the nine year old readers are: first the dependence on specific semantic cues before information from beyond the sentence is utilised, resulting in the use of such information being more effective over a wider range of items for the younger reader, second, a much more restricted lexicon. The inability to treat the text as a linguistic unit also differentiates failing readers from nine year olds and is the major symptom of reading failure.

c) Cognitive difficulties: It is argued in this thesis that many of the reading difficulties of the subjects described as 'failing readers' have their origins in various levels of cognitive processing.

The use of pictorial imagery rather than verbal association may, it is suggested, be responsible for some difficulties in the area of hypothesis generation. The failing reader may form a hypothesis at too early a stage without waiting for all the relevant information and then find it difficult to refine or discard his hypothesis. The point at which the hypothesis is formed depends partly on the system of chunking without reference to following context and partly on recognition of the semantic network structure associated with a specific verb. Because the sentence is not being processed as a unit, information from later parts of the sentence may only be processed if the semantic network re-constructed by the reader has obligatory slots remaining empty. If the representation of the text is being processed

as an image, it may also be more difficult to decide which elements should be foregrounded and carried forward; in verbal representation such foregrounding is more readily carried out and may even be essential.

The ability to recognise those parts of the text which are nuclear, or which contain the gist, is essential if details of the wording of the text are to be released from short term memory without destroying the text's framework. It would seem likely from their responses on these tests that failing readers are not aware to the same extent as normal nine year olds of the position of such points in the text. Whether they are processing the text by imagery or verbalisation, they are unable to distinguish nuclei from catalysers. This would appear to indicate a difficulty in logical processing which would make unworkable the hierarchical view of text processing described by Levenston (1983), in which the reader moves between processing levels in accord with a set of hypotheses which require different types of information at different stages in their development.

Van Dijk (1977) argued that macro-structures in text were the result of cognitive processes in comprehension; the inability to re-construct macro-structures must be seen as a failure in such processes. Without such structures the failing reader is forced to rely on fragmentary processing which may require greater attention to the print. This type of reading, carried on over a long period, will in itself give rise to a wrong mental set and make remediation more difficult. Remedial programmes which concentrate on text fragments - word recognition or sentence reading - may themselves contribute to continued failure.

Since the main difference between the failing readers and the two groups of normal readers was in this area, the inability to treat the text as a connected whole, it is the conclusion of this research that remedial programmes should be directed more towards the cognitive and logical processing of complete texts rather than by programmes relying on oral reading or teaching of specific 'sub skill' areas. Diagnosis by analysis of errors will yield information regarding the specific focus of such activities for individual pupils.

II EFFECTS OF TEXT STRUCTURE ON CLOZE RESPONSES

The complexity of the results in chapters 5, 6 and 7 points to the difficulty of studying the effect of any single aspect of text structure in isolation and therefore in the effects of such structures during the testing of reading. Despite this restriction the results do serve to support the argument of Klein Braley (1981) that not all cloze tests of nth word deletion can automatically be assumed to be reliable and valid tests of reading. Some items did not distinguish between good and poor readers even when lexical deletion was employed. Had deletions included function words, the number of items distinguishing between the groups would have been fewer.

It is precisely this characteristic of the results which may prove to be useful in the designing of remedial programmes. If it is possible to isolate within texts deletions which do not distinguish between good and poor readers from those which do make a distinction, and if these deletions can be described in terms of text structure, remedial programmes may be designed around the types of structure which cause difficulty to failing readers.

Table 8.1: Effects of text factors on cloze response

	Increased Difficulty			Significant Difference from failing readers in			
				Theme related errors		Non-theme related	
Group of readers	F	9	12	9	12	9	12
Text factor							
a) Discourse level							
1 Narrative type				x	xx		x
Inform. type	x	x			xx	xx	xx
2 Cohesive				x	xx		x
Non-cohesive	x	x	x		xx		xx
3 Nuclei	x	x			xx		x
Catalysers	x			x	xx		x
Informants							x
4 Verbs/Process	x	x			xx		
Verbs Result A						xx	
Process. Obj.	x	x					x
Static Objects					x		x
5 High Predict				xx			xx
Low Predict	x	x	x		xx	xx	xx
b)Sentence level							
1 Length					xx		xx
2 Simple				x	xx		xx
Compound	x		x		x		
Complex			x		xx		
3 Position of Word in sent.	x	x					
c) Phrase level							
1 NP Length							
2 NP Subject	x	x					
NP Object							
NP in modifier							xx
3 NP before verb	x	x					x
NP after verb					x		xx
4 VP length							
5 VP structure					xx		
d) Word level							
1 Noun							xx
Verb	x	x	x		xx	x	
2 Dale Chall rating	x	x	x		xx	x	xx
3 Number of acceptable alternatives	x	x	x				

x p = .01 xx p = .001

Table 8.1 shows the effects of specific text structure in increasing the level of difficulty for the three groups of readers. It also indicates the level of significance of the difference in pattern of error responses between failing readers and the other two groups, nine year olds and normal twelve year olds, on deletions of specific types. Thus the narrative deletions did not increase difficulty significantly for any group of readers but did produce significantly different patterns of response from the three groups when working within the theme of the text and from normal twelve year olds when working outwith the theme.

i Word level description

From the results of Preliminary Study 1 it was obvious that words must be considered not only as isolated units but as components of larger structures. There were, however, certain characteristics of words which had a significant effect on results.

a) Grammatical form class

Throughout the studies this has been shown to be a contributory or associated factor wherever difficulty of restoration was experienced. General findings in Preliminary Study 1 were similar to those of Fillenbaum (1963); the classes of prepositions, articles and pronouns were easier to restore than those of nouns and verbs, while adjectives and adverbs were more difficult. Deletions of nouns and verbs only produced cloze scores similar to nth word deletion. Difficulty is associated with the strength of syntactic cues and the size of the lexicon within the form class. In older fluent readers who have

mastered the syntax of printed sentences, this may cause the task of cloze restoration to become a purely semantic one at the conscious level. For younger, less-skilled readers, the strength of violation of syntax will be related to the form class of the word deleted; deletion of function words may provide valuable practice in recognition of phrase structure and in particular of phrase boundaries. Deletions of nouns, adjectives and adverbs may establish habits of effective lexicon search in the presence of strong syntactic constraints.

The deletion of verbs obviously causes special syntactic problems and should probably be avoided until fluent reading is established. The differences between responses to nouns and verbs suggest that restoration of the two form classes may test different aspects of reading. Verbs tend to produce more responses related to the theme of the passage and more responses which rely only on preceding context. Verbs were generally less predictable than nouns in the listening test given to older fluent readers. More nouns than verbs involved the reader in the use of information from beyond the sentence. This may suggest that the theme of the passage is carried forward by nouns and that their absence makes it more difficult to follow. The presence of the subject noun acts as a strong constraint on the verb.

b) **Position of word in sentence**

Where only one word is to be deleted from a sentence, the results presented here suggest that, apart from the first word in the sentence, its position will not affect results. However position of word in sentence is related to phrase and sentence structure and to

sentence length; words which come before the main verb may be more difficult to restore for younger less-skilled readers.

Where more than one word is to be deleted from a sentence, the question of interaction of incorrect responses must be considered. If only nouns and verbs are deleted, as in the tests used in this study, the second deletion in a sentence is likely to be negatively affected by an incorrect response to the first in at least thirty per cent of cases. Within-sentence cohesive ties should not therefore have both elements deleted.

There was a complex interaction between literary text type, predictability and position of word in sentence which affected different groups of readers differently. On informative material failing readers tend to make use of information from beyond the sentence on words which come later in the sentence, while normal twelve year olds tend to use such information on words near the beginning of the sentence.

c) **Standard frequency**

It is suggested that the standard frequency of words offered as responses is of more importance in the use of information from cloze tests than the standard frequency of the words deleted. If the text has been chosen at a level of difficulty appropriate to the readers, it should contain few words which are outwith their oral vocabulary. If responses are seen to come from a more restricted lexicon, as with the failing readers in this study, problems of access to lexicon during reading and in particular during cloze tests are raised. The question of the subjects' ability to write or spell less common words

is also relevant. If the problem is specific to cloze, the question of the comparative validity of cloze tests for use with failing readers must be considered. Since the nine-year olds did not exhibit this restricted lexicon in their responses, this problem may be specific to failing readers and not to their level of reading attainment.

d) **Distribution of meaning cues**

Since no evidence has been obtained of the use of information from following sentences, it is suggested that the practice of deleting words dependent on such information, 'backward acting cues', may be counter-productive, in so far as it involves a behaviour pattern which may not be normal to fluent readers. The need to instil the importance of the sentence as a unit of text will however be assisted by the deletion of words which depend on cues from later in the sentence.

In making deletions, the number and type of transfer features acting on, and supplied by, the deleted word should reflect the age and reading ability of the subjects. If too many deletions involve the removal of markers of such features as tense or number, less-skilled readers may not be able to establish the relevant feature.

It is suggested that instead of the 'random' deletion of every nth word, cloze tests should be created with specific types of words deleted when it is considered necessary or beneficial to concentrate on certain aspects of the text structure. In choosing words to be deleted, the factors described above should be considered in relation to the larger structures of which the text is composed.

ii Proposition level text description

Text frequency, the number of times a given word appears in the text, proved the best single correlate of difficulty in Preliminary Study 1. This feature may be involved in two types of text description. A word which is often repeated is likely to be 'foregrounded' and to be of importance to the theme of the text; a text which contains many repetitions of the same word is likely to contain more 'given' and less 'new' information and, in terms of proposition analysis, will produce a compact text base which is easier to process than one which contains many different arguments.

In assessing the amount of information in a text, text frequency and propositional analysis must be related to the existing knowledge of the reader. If the cloze test is designed to evaluate purely linguistic competence, it ought in principle, though there are considerable practical problems, to provide a close match of background knowledge and text content. As Levenston (1983) and Huddleston (1978) argue, exophoric reference is basically different in kind from reference within the text and involves pragmatic abilities which are not necessarily linguistic.

iii Phrase level text description

The disruption to phrase level processing occasioned by deleting words from a text must be seen as one of the most serious disadvantages of the cloze procedure. Even in the absence of physical gap in the text, less-fluent readers may have their normal reading behaviour seriously distorted by syntactic and semantic violation. Since they experience

difficulty in recognising phrase boundaries, they may use the deletion point as a phrase boundary and experience severe difficulty in trying to impose a structure on the string of words preceding a deletion. This string may in fact cross phrase boundaries. The use of cloze tests with subjects whose reading ages are below twelve may therefore be a questionable procedure when purely quantitative assessments of reading comprehension are required. The exact age at which this difficulty is overcome has not been established by this thesis; it is still present to a significant extent in the responses of normal nine-year olds. More serious is the effect on the assessment of failing readers who continue to produce a large number of errors occasioned by this difficulty up to the age of fifteen. At fifteen years of age the percentage of errors arising from treating a deletion as the end of a string rather than as in integral part of a phrase is two per cent for good readers, four per cent for average readers and seven per cent for poor readers; these figures are obtained by adding the two categories of errors of Hesitation, TH and NH. This is a significant contribution to the differentiation of scores. While it may be argued that this aspect of cloze procedure tests an aspect of reading, the ability to recognise phrase structure, it cannot be equated with normal reading. A poor reader faced with an unknown word in a text may adopt a different strategy from that employed when faced with a gap or deletion point.

Both Noun and Verb phrase structure affected the responses of readers up to the age of fifteen. Noun phrases in the object position did not generate a different pattern of responses in good and poor readers. Verb phrases which consisted of a verb plus a modifier differentiated between twelve year olds and nine year olds, but not between good and

poor readers in secondary school. For other types of verb phrase this pattern was reversed. These differences were however only significant in the patterns of errors which were related to the theme of the text; when working on a fragment giving rise to a Group N error, only poor readers were significantly affected by verb phrase structure. If phrase structure alone were responsible for the difference, it would have affected both within and outside theme processing. Since it did not, yet another indication is presented of interaction between levels of processing, with readers of different ages and levels of ability being affected at local level to varying extents by the larger structures within the text.

iv Sentence level text description

Results concerning the effects of sentence structure and sentence length are inconclusive. In Preliminary Study 1 sentence length was found to be related to ease of restoration. In the comparison, less-skilled readers experienced greater difficulty in processing compound than simple sentences; this effect was obscured by the effect of deletions within longer sentences interacting. The type of error response offered by all groups was affected by both sentence length and sentence type. Compound sentences gave rise to more errors caused by relying on preceding context than did simple or complex sentences. This may relate to the markers being used to segment the sentences; it is more likely that a subordinate clause will be seen as an integral part of a sentence than that a conjunction will be sought when a principal clause has been recognised.

The different evidence regarding phrase and sentence processing

appears to support Caroll's view (1978) of segments as functionally complete sequences. This model would appear to offer the best description of what the reader actually did. They used cues to local structure to identify or create a perceptual unit but the length of the unit was determined by their processing capacity, which appeared to increase with age. The limit size was the complete sentence.

Less-skilled readers recognised the deletion 'had ridden their bikes to the river. For a - -' as part of the preceding sentence and completed it with a purpose -'swim', 'picnic', 'race'. By this method they integrated it into a functionally complete sequence and decreased the amount of processing required to create a new unit beginning with a modifier. Similarly, the errors which rely solely on preceding context indicate a willingness to complete a sequence at a deletion, rather than to hold it in short term memory until a real boundary in the text structure is reached. The recognition of phrase, clause and sentence limits in the creation of functionally complete sequences is an essential component of fluent reading and a description of texts in terms of such sequences may reflect the fluent reader's segmentation of the text.

v Discourse structure

Information from beyond the sentence was important in the restoration of twenty-four items for twelve year olds and thirty-one items for nine year olds. This last finding is important as it suggests a stage in the development of reading, reached by normal readers at age nine, at which the ability to make use of such information compensates for the less sophisticated processing of within sentence information. The

failing readers in this respect seemed less able to make between sentence connections than normal nine year olds. The ability to treat the text as a cohesive unit is also reflected in the proportion of responses related to the theme of the text. By age fifteen, poor readers were still losing the theme on twenty-one per cent of all responses; this figure represents the total of Group N response and zero responses. For good readers at age twelve the figure is four per cent, for nine year olds, ten per cent. It is obviously essential to relate this inability to follow the theme to specific text features if remedial programmes are to be created.

a Halliday and Hasan's system of cohesive ties

Failing readers were able to make use of information from beyond the sentence on seventeen items which were involved in cohesive ties and on only eight others. They were more dependent on these explicit cohesive features in making connections between sentences than other groups of readers. Normal readers made more errors of hesitation on cohesive items, that is they were less likely to use information from following context on cohesive items than on non-cohesive items. It is possible that the necessity to carry forward the cohesive information restricted the attention available for processing following context. Where the deletion was the first half of a cohesive tie requiring the use of information from a following sentence, the natural processing in sentence units would prevent the use of such information. This effect was most significant in the responses of good readers in the whole school study.

Creators of cloze passages as methods of instruction may find it necessary to consider the implication of these findings in regard to

the distance and direction of cohesive ties from deleted words. The deletion of a large number of elements of cohesive ties may disrupt the cohesion of the text to an excessive degree and this may effect poor readers to a great extent than good readers.

b Semantic network

The fundamental importance of the nature of the action involved in a semantic network has been indicated by the results for verbs of process and resultive action and for processive and static objects. If a process is a simple physical process, like those in the test materials, the network involves as obligatory constituents only the patient and the action. A resultive action requires a system including cause and result as well as agent, although not all of these may be made explicit in the text; this is apparently a more complex system to process. Since the subjects found resultive actions easier to restore than processes, the complexity of the network does not appear to be the determinant of difficulty. Verbs which are processes tend to produce more errors of syntax and of hesitation; that is, the reader ignores following context. The first type of error would suggest that the subjects had more difficulty in re-creating the verb structure. The second might arise from the type of network which they expected to be associated with the verb of process; when the patient and the action had been specified they did not require to include any further information in the network and so did not look ahead. Since the texts were all at a very concrete level (Gillie, 1957), it should be the difference in network structure rather than the lexical content which causes the variation in response. Differences associated with verb phrase structure may also be related to the type of network

involved and the parts of the network which the reader recognises as obligatory.

While these results are based on a small number of items, they suggest that an adaption of Frederiksen's system for description of texts may yield valuable evidence regarding the semantic and logical structures utilised by readers in text processing.

c Ideational importance

The category of informants, those units which add details of time and space to the outline of the text, did not occasion different response patterns between normal and failing readers and nine year olds. Nine year olds found nuclear functions more difficult to process than other units; that is they were aware of those points in the text which were of low redundancy and were of importance to the development of the structure of the text. Poor readers found nuclear functions and catalysers equally difficult to handle; they could not distinguish between points of major decisions and minor addition points. Good readers found all three types of unit equally easy to handle. The normal reader appears to have developed by age nine some concepts regarding text framework and between age nine and fifteen develops strategies for recognising logical possibilities at points of choice. The difficulties experienced by failing readers in making conections in the absence of specific cohesive ties would suggest that this skill is a logical and mental operation rather than an increase in ability to make use of information from the text. Since the poor reader does not differ from others in the processing of cohesive items, it may be assumed that if similar specific semantic information were available

for the restoration of other items it would be utilised; difficulties in distinguishing nuclear points in the text may therefore be ascribed to logical processing problems.

It is significant in this respect that catalysers and informants generated more errors of expectation than nuclear functions, as defined by Barthes (1980); the subjects were prepared to rely on their own hypotheses or expectations at points which were not important to the development of the text; at nuclear points they were more likely to produce errors arising from not using following context. It would appear that Barthes' system like that of Frederiksen may yield a valuable method of studying difficulties in mental processing of text.

d Literary text type

The distinction between narrative and informative texts has been shown to be a real one in terms of readers' responses. Whether the distinction is the total effect of a number of structural features, or the result of the reader's perception of the writer's purpose, is difficult to ascertain. Only good readers at secondary school found informative texts as easy to process as narrative. All readers were prepared to rely on their own expectations and to make less use of following information in processing narrative. Informative texts resulted in errors of vocabulary and fragmented processing. The patterns of response produced by nine year olds on informative texts differed significantly from those of failing readers of equivalent reading age. The younger readers experienced significantly more difficulty in processing isolated sentences from informative texts than did the older failing reader. The distinction between text types

must therefore be reflected within sentences as well as at discourse level. Sentences from informative texts may require the reader to make more use of information from background knowledge. The poor reader at age fifteen is relatively less competent at processing informative than narrative texts.

Discourse level descriptions of text of various types may therefore be useful in relating reading behaviour to either specific semantic structures within the texts, the mental structures and processes required for its interpretation or the purpose for which the text was written. Difficulties experienced by failing readers appear to be related to the mental rather than the semantic processing required.

III IMPLICATIONS FOR THE TEACHING OF READING

i Remedial reading programmes

The findings of the tests and the results of the remedial programme described in Chapter 7 indicate that an emphasis on 'higher level' areas of difficulty may produce improvements in reading performance greater than those achieved by traditional word-recognition and reading laboratory programmes.

Diagnostic profiles obtained from cloze tests by the application of error analysis add to the information obtained from oral-reading miscues and the tests of auditory and visual discrimination normally used in remedial departments. It is suggested that the error profile may eliminate the need for other types of test in those cases where reading failure is shown to be due to comprehension difficulty of the types outlined in Chapter 7.

The exercises designed to improve visual scanning reduced the number of scanning errors produced in only six out of nine cases. The three readers who continued to produce errors of scanning improved their reading ages by an average of twenty-three months over the six month period. This suggests that visual scanning difficulties in isolation were not a major source of comprehension failure and that remedial exercises in this area may not be essential.

Word recognition difficulties were not a focus of this study. Since twelve of the fourteen subjects arrived at reading ages of over nine years six months without specific word recognition exercises, it is

suggested that remedial exercises in this area may be unnecessary for pupils who arrive at secondary school with reading ages of eight years and over. Word recognition programmes may be suitable for some readers of lower attainment.

The studies carried out by Morris (1967) in Kent for the National Foundation for Educational Research provide a valuable large scale report on primary reading teaching and on the difference in experience between good and failing readers in junior schools. Morris found that word recognition correlated more with silent reading comprehension ability for poor readers than for good readers at ages ten and eleven. She also found that some good readers had a measurable degree of difficulty in decoding. Morris concluded that:

> An emphasis on phonic training leading to greater ability in analysing and synthesising phonically regular words is futile unless accompanied by improved facility in word recognition generally and reading comprehension in particular.
>
> (Morris, 1967, p 165)

Chunking of the type of text used in this study was a source of limited localised difficulty. Exercises designed to improve this ability were generally unsuccessful. Two factors may have contributed to this finding. First, the syntactic violation caused by deleting words may have obscured phrase boundaries. If cloze is to be used as a teaching device with readers who experience this type of difficulty, this violation may require to be compensated for by some system of phrase marking. Secondly, the subjects may have had insufficient practice in handling the sentence structures of normal printed language. It is suggested that, where reading difficulty prevents adequate practice in silent reading, tape recording of printed

language of a level of sophistication appropriate to the age of the pupil should form a major part of the reading programme.

Continued exposure to the sentence structures of basal and remedial readers will not develop the ability to handle the syntax of more difficult texts. It may also generate expectations of simple structures which may be difficult to modify at later stages. Morris (1967) found that a significant number of poor readers were still using infant primers at age eleven. The years since her study have seen the publication of many 'remedial readers' using the same format and linguistic structures as infant primers but with content designed to increase adolescent interest. The reading records of the failing readers who made up the experimental group in the present study consisted entirely of references to such reading material and to phonic programmes. If cloze procedure, group prediction, sequencing or 'higher order' skills were taught, no record had been kept of this. Morris found that poor readers were given oral reading tasks on unprepared material and were not provided with incentives and reinforcements in the form of related follow-up activities.

The findings of the present study regarding the 'low level' components of the reading process - scanning, word recognition and chunking, support the recommendation by Morris that reading shoud be accompanied by activities based on the text. The insistence on preliminary prepared oral reading of the text by Morris is not supported, individual silent reading formed the basis of all activities described in Chapter 7.

The emphasis on interaction in the activities designed to establish

the habit of viewing the text as a whole is considered to be the major innovation in the remedial programme described in Chapter 7. By the activities of prediction, sequencing, entitling and summarising, failing readers were encouraged to consider and discuss the nature of connections between sentences, to identify and focus on important units within texts at a variety of levels and to extend their exaphoric contribution. The success of these activities supports the hypothesis that such 'higher level' components of the reading process make a significant contribution to reading failure. Failure in these areas retards total reading development and prevents practice, of the type experienced by normal readers, in the 'lower order' components.

It is suggested that remedial programmes for failing readers in secondary schools should concern themselves with the 'higher levels' of text processing. The causes of failure in reading may be related to primary teaching methods and it was therefore considered appropriate for this study to contain some comments on the methods used in the earlier stages of reading learning.

ii Primary Reading Teaching

The over-emphasis on oral reading and phonic programmes in the remedial reading records of failing readers has already been commented upon. Remedial education was not offered until Primary 4, age 8 years, by which time three years of reading learning had taken place. This learning may have been correct or incorrect or it may have differed in speed between individuals. The comparison between failing readers at age twelve and normal readers at age nine would suggest that reading failure may arise from incorrect, rather than slow, learning.

The methods of beginning reading teaching outlined by Morris (1967) are still those used in the primary schools involved in this study. A small number of whole words are learned as sight vocabulary which is expanded by progress through a basal reading scheme. At approximately six months to one year after entry to school, phonic programmes are introduced. Oral reading continues on the basis of individual pupils reading to a teacher, usually once a day, on a passage prepared at home, throughout the first three years of schooling. Campbell (1981) describes this activity as being more concerned with the supervision of reading progress than with the teaching of reading. Pedagogical moves designed to teach specific aspects of reading accounted for only twenty-six per cent of teacher verbal moves during oral reading. Only nine per cent of all moves, usually in the form of questions after reading, were concerned with comprehension. Teachers also read fiction aloud to the whole class.

Children who fail to make adequate progress on the main books of the reading scheme are given supplementary readers using the same vocabulary. Supplementary material is included in some published schemes, for others it has to be created by the teacher. When initial phonic teaching fails to establish letter sound relationships, further practice on exercises of the same type is given.

Little use is made of the types of activity designed to encourage interaction with the meaning of the text. It appears to be the case that failing readers in infant classes are given more practice than normal readers in oral reading and phonic work and thus develop the idea that 'good reading' is equivalent to accurate decoding. At the same time, their slow progress through the books of the reading scheme

may lead to boredom and to negative self-concepts.

It is suggested that infant and remedial departments in primary schools should ensure that all readers have practice in activities designed to develop 'higher level' processing and that all are exposed to a variety of interesting texts of a level of linguistic sophistication appropriate to their ages. Where decoding difficulties exist, it may be helpful if the printed text is accompanied by oral reading by a fluent reader.

IV IMPLICATIONS FOR FUTURE RESEARCH

i Reading failure

This study has presented results and drawn conclusions from studies based on cloze tests. Other research techniques will also need to be used in further investigations of issues raised here.

Scanning as a contributory factor in silent reading comprehension failure may be investigated by eye-movement research. Since the problem appeared to be associated with segments of text of less than five letter spaces, investigations might focus on such segments at various positions in the sentence to find critical positions and types of segment which may cause failure. Practical difficulties in this type of research will be considerable.

The restricted lexicon used in cloze responses by failing readers also requires further investigation. The use of a multiple-choice cloze test offering several responses which are correct but vary in standard frequency would enable failing readers to overcome problems of

orthography and lexicon search and should therefore provide a clear indication of the extent of lexical restriction.

The development of chunking requires to be studied in relation to both chronological age and reading age. The present study has indicated that it is the latter which is more closely related to the individual's ability to reconstruct syntactical structure of printed language.

The mental processes of failing readers cannot be the subject of direct observation. A structured interview technique might yield some information regarding differences in the conscious processing of text between good and failing readers but would require a control for differences in the ability to verbalise.

Areas in mental processing which appear to contribute to reading failure are restricted ability to generate alternative hypotheses regarding text and to identify and carry forward important ideas in the logical framework of the text. These areas require to be studied by methods which do not permit interference from other language areas.

ii Text structure and reading development

This study has suggested the importance of relating reading success and failure to specific structures within the text at a variety of levels. It is suggested that much previous research in reading has paid insufficient attention to the texts used and that an important area for future research is the investigation of the relationship between reading development and text structure.

Systems of text description which could be readily applied to texts used in reading research would provide valuable tools for such developments.

iii Cloze procedure

This study has suggested that some of the problems experienced in the completion of cloze tests are specific to that procedure and affect different groups of readers differently. The type of response analysis presented in this study may yield information regarding qualitative aspects of reading development and thus increase the usefulness of cloze tests. The quantitative reliability and validity of cloze tests for use with readers of different ages and levels of ability also appears to warrant further investigation.

V RESERVATIONS

i Subjects

The subjects were drawn from one secondary school catchment area in Scotland. Replications in other geographical areas should be carried out before the findings are accepted as generally applicable.

ii Materials

The findings have, in the main, been derived from four texts. A wider range of materials should be used to verify the results.

iii **Method:**

As stated above, findings derived from cloze tests require to be verified by other research methods before they can be regarded as typical of normal silent reading.

The remedial reading programme was carried out by one teacher and would require to be validated by wider use. The device of considering Theme related and Non-theme related errors separately leads to calculations of chi-square from very small values in some cells. This necessitates some reservations of a statistical nature.

VI SUMMARY

A list of specific conclusions regarding hypotheses is given in Appendix III.

Failing readers differ from normal readers of equivalent chronological age in their ability to process both the syntax and the meaning of sentences. They generate fewer hypotheses regarding the possible meanings of isolated sentences. Their lexicon is severely restricted in the choice of cloze responses. Problems of visual scanning occur more frequently in the responses of failing readers but are localised in their effects. In general they affect short words, less than four letters, and punctuation marks. The use of following context to the end of the sentence is typical of normal readers at age twelve; failing readers use only a limited range, approximately twelve letter spaces. The lack of use of following context obscures phrase structure and makes chunking more difficult.

Structures which cross sentence boundaries are also more difficult for failing readers to process. They depend on specific cohesive ties to a greater extent than normal readers in their perception of relations between sentences. They also have a less sophisticated approach to semantic networks; this may be related to the lack of use of following context.

Failing readers have difficulty in identifying those units of the text which are important for its logical development and have difficulty in seeing the text as a unit. This may be due to a difference in mental processing.

Failing readers resemble normal readers of equivalent reading age, normal nine year olds, in their control of syntax in printed material, restricted use of following context, difficulty in restoring nouns coming before the verb, and difficulty in restoring semantic networks involving verbs of process. Failing readers use a more restricted lexicon than nine year olds and make less distinction between units which are of importance to the theme of the text and less important units.

Nine year olds are already better at scanning than failing twelve year olds and make use of information from beyond the sentence on a great number of items. Nine year olds have already developed the capacity to treat the text as a whole to almost the same extent as normal twelve year olds, although they are more influenced in this area by the distinction between narrative and informative texts. The errors of nine year olds showed greater awareness of the sentence as a unit of text and a tendency to generate more expectations than failing

readers. At frustration level, nine year olds were more likely to leave a gap unfilled while failing readers inserted 'nonsense responses'.

The effects of text structure on difficulty level and type of response offered are summarised in Table 8.1, p 235.

Reading failure was seen as having components from scanning, word recognition and chunking and from the mental processes of the reader during his interaction with the text. The first three components may be affected by the special nature of the reading involved in the completion of cloze tests. Scanning difficulties are localised to small items of visual information and chunking may be affected by the interference with phrase boundary recognition of syntactic and semantic violation caused by deletions. Failing readers were not able to overcome these difficulties to the same extent as normal readers. Failing readers were able to recognise semantic structures in the form of both networks and cohesive ties. In processing networks, they tended to consider the network complete when obligatory slots had been filled and paid less attention than normal to modification following the verb. They were more dependent for their perception of cohesion on specific cohesive ties in the text. They were unable to discriminate between important and less important text units. It is suggested that hypothesis generation and modification may be more difficult for those failing readers who may use imagery rather than verbal association in processing texts. The lexical and syntactic elements in the failure of these readers may be overcome during normal reading practice. Their basic inability to follow the development of

the topic of a text may require a new type of remedial reading programme and suggests change of emphasis in primary reading teaching.

The various levels of text description have been shown to be useful in relating responses of different groups of readers to specific features of the text and in suggesting areas of difficulty for different groups of readers. The implied interaction of text features at various levels must cast serious doubt on the use of short cloze tests to give a global score or even to investigate any single level of processing in isolation. Tests which are designed to investigate any one of the features examined above would require either to be controlled for all the others or to cover such a large body of varying material as to sample every possible interaction. The results of this study present suggestions which may be useful to the teacher of reading although more studies will be required before the ages and levels of reading ability at which each factor should have become prominent in teaching programmes are fully established.

In addition to suggesting diagnostic approaches and teaching methods arising from them, the results and the analytical procedures reported here give rise to means of diagnostic testing using the cloze procedure. The findings also imply the need for further research and the analytical systems provide possible methods towards carrying it out.

APPENDICES

APPENDIX I.1 : Sources of texts

1. Mainline English, Book 2, p.55: Watson T F and Quinn G H: Holmes MacDougall, 1975

2. Patrick the Parrot, p.6: Webster J: Ginn,1970

3. Adventure on the Road, p.3: Webster J: Ginn, 1970

4. Black Beauty, p.1: New Age in Reading: Clay E: Edward Arnold

5. Mainline English, Book 3, p.44: Watson T F ans Quinn G H: Homes MacDougall, 1975

APPENDIX I.2: Comprehension Questions:

Text 1:

1 What was the first wrong thing the boys did?

2 Where did they go?

3 Why did they use a ladder?

4 What were they going to do up in the tree?

5 Who saw them?

6 What did he do?

7 What did the boys do?

8 What do you think 'to say to' means?

9 What is an orchard?

10 Why do you think the headmaster was angry with them?

Text 2:

1 Who wrote the story?

2 What is the uncle's job?

3 What kinds of present does he bring?

4 What are docks?

5 Why did he think the ship had had a bad trip?

6 Where did he meet his uncle?

7 and 8 Describe his uncle?

9 What is an uncle?

10 Why do you think the boy wants to work on a boat?

Text 3:

1 What kind of animal is the story about?
2 Where does it live?
3 What is a hedgehog?
4 Do many people keep hedgehogs as pets?
5 Who wrote the story?
6 How many people are in her family?
7 Is she older than her brother?
8 What does 'teases' mean?
9 Are they good friends?
10 Why are they especially good friends?

Text 4:

1 Who wrote this story?
2 Where did it live when it was young?
3 What is a meadow?
4 What is a colt?
5 Were the colts younger than Beauty?
6 What size were they?
7 Where did they rest in summer?
8 Why?
9 Where did they live in winter?
10 Was the horse happy when it was young?

Text 5:

1 What kind of bird is the story about?
2 Are there many sparrows?
3 How can you tell a male sparrow from a female?
4 What is a female?
5 How does nature protect some birds and animals?
6 What does protect mean?
7 What is a crash landing?
8 Why do some young birds make crash landings?
9 Where do some sparrows build their nests?
10 Why?

APPENDIX I.3: Sources of texts: Preliminary Study 2

Remedial Reading Workshop, Ward Lock Educational:

Green Cards 1,2,4,6,7

Furry Creatures of the Countryside: G E Hyde, Hulton, 1963

Science Research Associates: Reading Laboratory IIa:

Green Cards 4,7,11

APPENDIX I.4: Source of text: Preliminary Study 3

Clear English Book 2, p.16, Finlayson D S and Smith T D:
Thomas Nelson and Sons, 1973

Sample sentences from fragmented presentation with and without gaps.

1 The farmer's house looked to the buildings of farmyard.

1 The farmer's house looked to the buildings of farmyard.

APPENDIX I.5: The four texts used in the comparison study

Text 1:

Alan Harper took the bend without slowing down. His long yellow hair trailed out behind him. His motor bike was fast and loud and sounded like a plane taking off. A few seconds later he was going up a high hill. Suddenly his front tyre went flat with a sound like a gun. Alan had to fight the heavy bike to keep control. He almost ran off the road before he was able to stop. Alan climbed down and looked at the flat tyre. The blow-out had made a hole in the side of the tyre. He knew he could not fix it.

From 'Gypsy' by Al Nusbaum: John Murray Ltd.: By kind permission of the publishers

Text 2:

Early in the afternoon, John and three friends had ridden their bikes to the river. For a while they threw stones into the racing stream. After a time they were tired of doing this. They decided to try skipping from rock to rock. As John was about to jump, he slipped and fell into the river. Now the boy was helpless, the fast moving water was carrying him closer to the falls. Just as John was ready to give up, his hand felt a rock. Quickly the boy

grabbed the rock and held on. It was his only chance to escape.

Passage based on a story in Lab IIa, Science Research Associates, Chicago, Illinois.

Text 3:

Fish first appeared in the sea millions of years ago. Today there are over forty-thousand different kinds. They breathe by taking in water through their mouths. The water then passes over their gills which take out the oxygen the fish need. Fish can see nearly all round themselves but only for a short distance. They cannot hear much but along their sides they have sensitive parts. These tell them of even slight movements in the water. They lay large number of eggs which look like a mass of jelly. A cod for example may lay ten million eggs in a year.

From 'Children's Encyclopaedia', Adam & Charles Black Ltd: By kind permission of the publishers.

Text 4:

Lead is a soft heavy metal. It makes a grey mark if you rub it on a piece of paper. About the year 1300 men were using thin rods of lead for writing and drawing. These were the first pencils. In some museums you can see the beautiful drawings that were made with these rods. They are called silver-point drawings. In the time of Queen Elizabeth lead for pencils went out of date. Some men digging at Borrowdale in the North of England had found a hard, black stuff. It was easy to cut and it made a thick black mark on paper.

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APPENDIX I.5: Specimen test pages

Test 1: Continuous location:

Alan Harper took the without slowing down. His long yellow trailed out behind him. His motor was fast and loud and like a plane taking off. A few later he was going up a high. Suddenly his front tyre went flat with a like a gun. Alan had to the heavy bike to control. He almost ran off the before he was able to. Alan climbed down and at the flat tyre. The blow-out had made a in the side of the. He knew he could not it.

Test 2: Continuous cloze:

Fish first_ _ _ _ _ _in the sea millions of_ _ _ _ _ _ago. Today there are over forty-thousand different_ _ _ _ _ _. They breathe by taking in _ _ _ _ _ _ through their mouths. The water then _ _ _ _ _ _ over their gills which_ _ _ _ _ _out the oxygen the fish need. Fish can_ _ _ _ _ _all round themselves but only for a short _ _ _ _ __ __. They cannot hear much but along their_ _ _ _ _ they have sensitive parts. These _ _ _ _ _ _ them of even slight - - - - - -in the water. They_ _ _ _ _ _large numbers of eggs which_ _ _ _ _ _like a mass of jelly. A_ _ _ _ _ _for example may lay ten million_ _ _ _ _ _in a year.

Test 3: Fragmented location:

1 It makes a grey if you rub it on a piece of.

2 Today there are over forty-thousand different.

3 Now the boy was helpless, the fast-moving water was him closer to the falls.

4 He knew he could not it.

Test 4: Fragmented cloze:

1 He almost ran off the_ _ _ _ _ _before he was able to_ _ _ _ _ _.

2 They breathe by taking in_ _ _ _ _ _through their mouths.

3 Early in the afternoon_ _ _ _ _ _and three friends had_ _ _ _ _ _ their bikes to the river.

4 They are_ _ _ _ _ _silver-point drawings.

APPENDIX I.6: Script of test instructions

These little books have some puzzles in them. The person who typed them has missed out some words and I would like you to put them back in.

For location task: When you find a place where a word has been missed out, I want you to draw a line straight up and down on the page and write the word at the top of the line like this:

(On blackboard: The|ate the bone. Read out.) Where is the word missing? After 'the', so I draw a line there like this. What do I write at the top of the line? Yes, dog. Just one word at a space. So it says, The dog ate the bone. Now the next one. I|my dinner. Where is the word missing? After I, so we draw a line there and what should I write at the top? (Take several alternatives). You see there can be many different answers, you choose the one you think is best. If you can see where a word is missing but you don't know what the word is, draw the line in anyway. Remember you draw the line and put one word at the top, just one word in each place. You must not put in more than one word at any line. Choose the word you think is best. The book has four/nine pages. When you finish go on to the next one. Make sure you finish each page before you go on. Don't turn back. See how many places you can find where words have been missed out and draw a line at each one. You have plenty of time so don't rush. Start now.

For cloze task: Use same examples on blackboard with deletions marked with a line of dashes: 'The places where the words are missing are marked like this. What should I write in the space? Dog, so it says 'The dog ate the bone.' Now the next one. 'I_ _ _ _ _ _my dinner'. What can we put in there. (Take several alternatives). You see there can be many different answers, you choose the one you think is best. You must not put in more than one word at any space, just one word at each place. Choose the word you think is best and write it in. The book has four/nine pages. When you finish one go on to the next one. Make sure you finish each page before you go on. Don't turn back. Choose the word you think is best to write in each space. You have plenty of time so don't rush. Start now.

(All the subjects had previous experience of cloze procedure as a teaching device so explanation did not require to be too laboured).

APPENDIX I.7: List of specimen responses of each category

Group T: Responses related to the theme of the text

TS: Errors of Scanning: caused by mis-reading or overlooking visual information.

eg. He fixed at the tyre
(looked)

TC: Errors of Chunking: caused by wrong re-construction of local syntax.

eg. His motor-bike was fast and loud and
just like a plane taking off.
(sounded)

TV: Errors of Vocabulary almost correct restoration of the original meaning usually generalisations.

eg. He was going up a high slope
(hill)

TE: Errors of Expectation: provides a text which is correct but differs in meaning from the original.

eg. His long yellow scarf trailed out behind
him (hair)

TH: Errors of Hesitation: caused by failing to read the following context.

eg. His front tyre went flat with a nail
like a gun. (sound)

TR: Random errors words related to the theme of the text but with no apparent connection to the local context.

eg. His long yellow motor trailed out behind
him. (hair)

Group N: Responses not related to the theme of the text

NC: Correct within the sentence.

eg. His long yellow tail trailed out behind him. (hair)

NH: Correct according to the preceding part of the sentence but not the following part.

eg. Alan took the dog without slowing down. (bend)

NP: Correct within the phrase, collocation.

eg. His long yellow daffodil trailed out behind him. (hair)

NN: Nonsense: no connection with any part of the text.

APPENDIX II: Relationships between text structure and readers' responses in the whole school study

a. Discourse level:

Table II.1: Patterns of response related to Item Types

Item Type	V	S	Z	Total T	Total N	Group T Errors TS	TV	TE	TH	TR	Group N Errors NC	NH	NP	NN
Type 1: (23)														
Good	66	22	0	11	1	4	42	52	2	0	12	21	50	17
Average	56	22	1	18	3	7	35	51	4	1	15	20	34	31x
Poor	35	18	11	25	11	14	30	39	10	6	11	34	23	32
TOTAL	52	20	4	18	5	10	34	46	7	3	12	30	27	31
Type 2: (13)														
Good	42	14	1	38	6	2	34	46	17	1	0	3	89	8x
Average	21	14	3	50	12	5	30	40	22	2	2	12	76	10
Poor	10	8	9	53	21	7	26	38	25	4	2	12	56	30
TOTAL	24	12	4	47	13	5	30	41	22	3	2	10	67	20
Type 3: (24)														
Good	60	21	0	15	4	14	22	57	6	1	75	14	7	4x
Average	45	19	2	23	10	10	22	54	12	3	59	19	11	11
Poor	27	15	11	25	22	12	21	48	14	5	54	16	8	22
TOTAL	44	18	4	21	12	12	22	52	11	3	57	17	9	17

The chi-square statistic which was used to analyse the results was calculated from raw frequencies. Limits of significance have been set at .01 and .001.

The item types assigned on the basis of responses of normal twelve year olds in Chapter 5 are reflected in the patterns of error of the subjects of this larger scale study. Difficult items, Type 2, gave rise to significantly fewer correct responses and forced all groups of readers to rely on local context producing a large proportion of errors of category NP, correct within the phrase. On easy items, Type 1, all readers followed the theme to a significantly greater extent than on more difficult items producing a higher degree of cohesion.

Type 3 items which rely for correct restoration on the use of beyond sentence information produced errors which are correct within the sentence, category NC.

Table II.2: Patterns of response on Narrative & Informative Texts Compared

Item Type	V	S	Z	Group T Errors TS	TV	TE	TH	TR	Group N Errors NC	NH	NP	NN	Total T	N
Narrative Texts (30)														
Good	55	24	<1	4	24	57	14	1	70	0	17	13x	19	1
Average	44	25	1	8	21	50	17	3	52	11	19	18	26	4
Poor	28	22	7	15	18	40	22	5	48	12	12	29	31	12
TOTAL	42	24	3	10	21	48	18	2	50	11	14	25	25	6
Informative Texts (30)														
Good	61	15	1	9	40	44	6	0	25	14	55	5	18	5
Average	44	13	3	7	35	45	11	1	28	19	41	12	28	12
Poor	25	6	14	6	33	43	12	6	21	23	30	26	31	22
TOTAL	44	11	6	7	36	44	10	3	24	21	36	19	26	13

Table II.3 Patterns of response related to cohesive ties

Item Type	V	S	Z	Total T	N	Group T Errors TS	TV	TE	TH	TR	Group N Errors NC	NH	NP	NN
Cohesive (26)														
Good	66	23	0	9	2	1	25	46	28	0	83	0	8	8x
Average	53	19	2	20	7	0	23	46	28	2	63	7	14	16
Poor	33	14	11	25	16	2	22	43	30	3	44	13	12	31
TOTAL	51	19	4	18	8	1	23	44	29	2	52	11	12	25
Non-Cohesive (34)														
Good	52	17	1	26	4	8	34	52	5	1	23	14	56	7
Average	38	19	2	32	9	10	31	49	8	2	18	23	46	12
Poor	22	14	10	35	18	15	28	41	10	6	22	23	32	24
TOTAL	37	17	4	31	10	11	31	47	8	3	21	21	39	18

Table II.4: Patterns of response related to Verb Phrases

Item Type	V	S	Z	Total T	Total N	Group T Errors TS	TV	TE	TH	TR	Group N Errors NC	NH	NP	NN
Process (14)														
Good	56	14	1	28	1	14	23	46	16	0	0	17	25	58x
Average	41	13	3	41	3	14	24	40	22	0	3	30	21	45x
Poor	21	8	14	47	10	16	25	34	23	2	15	12	11	61
TOTAL	39	11	6	39	5	15	24	39	21	1	12	16	14	58
Resultive Action (14)														
Good	57	16	1	25	2	3	47	45	4	1	24	44	28	4x
Average	42	16	2	33	7	6	40	45	6	2	11	49	29	11x
Poor	23	12	12	34	19	9	35	43	9	4	13	50	18	19
TOTAL	41	15	5	30	9	6	40	44	7	3	13	49	22	16

Table II.5: Patterns of response related to Discourse Function

Item Type	V	S	Z	Total T	Total N	Group T Errors TS	TV	TE	TH	TR	Group N Errors NC	NH	NP	NN
Nuclear (23)														
Good	63	13	1	21	3	2	41	37	19	1	44	27	20	8x
Average	48	12	2	30	8	2	36	39	22	1	43	33	10	14
Poor	29	9	10	33	19	3	33	34	22	8	36	30	10	24
TOTAL	46	11	4	28	10	2	35	37	21	4	39	31	11	20
Catalyser (24)														
Good	56	21	1	20	2	11	22	63	3	0	43	5	35	16x
Average	42	19	3	29	6	11	20	58	7	3	33	9	35	23
Poor	25	13	14	33	16	12	18	54	12	3	26	14	25	36
TOTAL	41	18	6	27	8	12	20	57	8	3	28	12	29	31
Informant (13)														
Good	54	28	0	12	6	5	34	55	4	1	26	0	73	1x
Average	42	31	0	17	10	12	35	43	9	1	21	3	74	2
Poor	26	26	7	24	16	25	28	31	15	1	28	5	51	16
TOTAL	41	28	2	18	11	16	31	41	11	1	25	3	62	9

Table II.6: values of chi-square in Tables II.1 to II.5

a) Within groups of readers

Table	Group of readers	Group T Errors				Group N Errors			
		Good	Average	Poor	Total	Good	Average	Poor	Total
II.1	item type	101.5	89.4	69.8	218.9	-	206.9	364.1	702.7
II.2	text type	49.3	39.5	95.8	140.5	29.6	27.9	89.4	149.6
II.3	cohesion	93.8	134.0	154.4	381.0	44.5	98.4	83.9	218.9
II.4	verb type	70.9	73.9	52.4	192.1	-	15.4	76.6	104.5
II.5	functions	136.4	158.6	197.5	427.1	-	155.3	171.0	397.3

- = frequency in cells too small for calculation
x = p=.01 NS = value of chi-square not significant
All other values, p=.001

b) Between groups of readers

Factor/Item type	Group T Errors	Group N Errors
Type 1	74.9	11.2 NS
Type 2	35.5	35.2
Type 3	25.6 x	25.8
Narrative	90.0	14.3 NS
Informative	52.4	58.3
Cohesive	8.5 NS	33.9
Non-cohesive	96.4	48.4
Process	21.0 x	-
Resultive Action	30.7	8.7 NS
Nuclei	64.4	16.4 NS
Catalysers	43.5	17.8 x
Informants	48.6	28.1

NS = Not significant x = p = .01 Al other values p = .001

The discourse level features of text examined in Chapter 6 were again shown to affect the responses of readers of all levels of ability on cloze tests. Six of the twelve features do not differentiate at the .001 level when readers are working outwith the theme, Group N errors, between readers of different ability levels. The difference between groups is also less significant on those items which have been shown either empirically, by the responses in Chapter 5, Type 3 items, or theoretically, Cohesive items, to depend on information from beyond the sentence.

b **Phrase level:**

Table II.7: Patterns of response on Nouns and Verbs compared

Form Class	V	S	Z	Total T	Total N	Group T Errors TS	TV	TE	TH	TR	Group N Errors NC	NH	NP	NN
Nouns (32)														
Good	60	23	0	12	4	1	27	61	9	1	42	4	51	3
Average	46	23	1	18	11	2	25	57	13	4	44	6	39	11
Poor	31	18	9	23	20	7	21	48	16	8	41	8	29	22
TOTAL	46	22	3	18	12	4	24	54	13	5	42	7	35	16
Verbs (28)														
Good	56	15	0	26	1	9	34	46	10	0	16	35	27	22
Average	41	14	3	37	5	10	31	42	15	1	9	44	27	20
Poor	22	10	13	41	15	13	29	38	17	3	14	37	16	34
TOTAL	40	13	5	34	7	11	31	41	15	2	13	38	19	30

x = based on less than 100 responses

Verbs produce proportionately more errors of syntax than nouns; the difficulties of re-creating structure associated with deletion of verbs have already been established. The greater lexical difficulty of restoring verbs is shown by a comparison between columns S and TV. Since both verbs and nouns have equal numbers of acceptable alternatives they should produce similar results in these columns. It may be that the tendency not to use following context affects both structural and lexical restoration of verbs more than nouns as the greater proportion of errors of category NH would suggest.

Table II.8: Patterns of response in Noun Phrases

Type of NP	V	S	Z	Total T	Total N	Group T Errors TS	TV	TE	TH	TR	Group N Errors NC	NH	NP	NN
After Verb (21)														
Good	68	19	0	7	5	1	43	53	1	2	35	0	63	2x
Average	53	18	1	15	12	0	50	63	2	5	40	5	44	11
Poor	38	15	8	18	20	1	24	61	3	11	37	10	34	19
TOTAL	53	18	3	14	12	0	30	60	2	7	38	7	41	14
Before Verb (11)														
Good	45	31	0	19	4	2	15	66	16	0	46	14	34	6x
Average	33	33	2	25	8	0	30	63	2	5	50	9	23	12x
Poor	17	23	11	31	19	14	17	33	31	5	48	9	18	25
TOTAL	32	29	4	25	11	7	17	47	25	3	50	10	21	19
Subject (7)														
Good	50	24	0	21	4	1	21	56	21	1	32	18	43	7
Average	35	24	2	29	10	1	24	43	29	3	52	8	25	15x
Poor	18	17	11	31	23	5	27	25	36	8	50	9	17	24
TOTAL	34	22	5	27	13	3	24	40	30	4	48	10	22	20
Object (7)														
Good	69	17	0	10	3	0	49	44	2	5	89	0	0	11
Average	53	16	2	17	12	0	43	45	4	8	56	14	5	25
Poor	36	11	11	21	21	0	38	39	4	19	33	16	14	38
TOTAL	53	14	4	16	12	0	42	42	3	12	45	14	10	31
Complement/ Modifier (18)														
Good	60	26	0	9	5	2	24	72	2	0	35	0	65	0
Average	48	26	1	15	10	3	17	73	5	2	36	2	59	4
Poor	34	21	7	20	18	11	10	65	9	4	41	3	42	14
TOTAL	47	24	3	15	11	7	15	69	6	3	31	3	51	8

Table II.9: Patterns of response in Verb Phrases

Type of verb Phrase	V	S	Z	Total T	Total N	Group T Errors TS	TV	TE	TH	TR	Group N Errors NC	NH	NP	NN
Verb + Object (9)														
Good	59	20	1	17	3	4	18	53	25	1	24	44	20	12
Average	58	8	2	23	9	1	17	69	11	1	12	55	28	5
Poor	26	13	11	27	23	5	19	49	25	2	16	53	17	14
TOTAL	47	13	5	22	12	4	18	57	20	1	15	53	20	12
Verb + Mod (8)														
Good	53	18	1	28	1	22	63	13	2	0	0	25	50	25
Average	40	19	15	37	3	18	58	18	4	1	0	37	31	31
Poor	22	13	13	40	12	18	54	19	7	3	15	11	18	55
TOTAL	38	17	5	35	5	19	58	17	5	2	12	17	22	49
Complex (11)														
Good	57	9	1	32	1	3	23	63	10	0	0	0	25	75
Average	29	17	4	47	3	10	20	45	23	2	7	20	20	53
Poor	19	5	14	52	10	14	20	44	19	3	8	27	12	53
TOTAL	36	10	6	44	4	10	21	49	18	2	8	24	15	53

Table II.10: Values of ch-square in tables II.7 to II.9

a) Within groups of readers

Factors Compared	Group T Errors Good	Ave	Poor	Total	Group N Errors Good	Ave	Poor	Total
Noun/verb	32.9	60.5	52.6	142.4	15.9	111.9	178.5	345.4
NP position	43.6	76.1	142.5	237.6	-	9.8NS	16.5	104.5
NP structure	42.3	101.6	188.6	329.2	-	73.9	75.4	174.4
VP structure	229.6	231.1	153.2	542.7	-	-	74.1	108.2

b) between groups of readers

Items Compared	Group T Errors	Group N Errors
Nouns	68.0	46.0
Verbs	41.9	15.0 NS
NP before Verb	72.0	11.5 NS
NP after Verb	30.6	40.7
NP Subject	39.7	11.6 NS
NP Object	9.4 NS	21.8
NP Comp/Mod	42.9	30.5
V + Object	22.9	7.0 NS
V + Modifier	19.6 NS	-
Complex VP	62.1	-

Both noun and verb phrase structures affected responses within groups of readers but there was no significant difference between groups in responses to noun phrases in the object position or to verb phrases which contained a modifier but no object when the subjects were working within the theme.

c Word level:

Table II.11: Patterns of response related to Dale-Chall Rating

Dale-Chall Rating	V	S	Z	Total T	Total N	Group T Errors TS	TV	TE	TH	TR	Group N Errors NC	NH	NP	NN
Common (45)														
Good	60	20	0	18	2	8	32	50	9	1	51	18	22	8x
Average	46	19	2	26	6	10	28	48	13	2	39	25	22	15
Poor	29	14	11	32	14	14	23	43	16	4	28	24	17	31
TOTAL	45	17	4	25	7	11	27	47	13	2	37	26	21	27
Known (10)														
Good	50	24	0	23	2	0	34	60	5	1	56	0	19	25x
Average	38	21	1	32	8	0	36	54	8	2	56	14	15	14x
Poor	21	14	10	32	23	1	42	42	5	9	47	18	15	20
TOTAL	36	20	4	29	11	1	37	51	6	5	50	16	15	19
Rare (5)														
Good	63	15	1	10	12	0	18	22	60	0x	2	0	98	0x
Average	35	17	2	23	23	0	20	28	48	4	6	0	84	10
Poor	20	18	9	24	30	0	18	18	61	3	16	0	66	18
TOTAL	39	17	4	19	21	0	19	23	56	3	10	0	78	12

values of chi-square a) within groups

	Group T errors	Group N errors
Good	144.3	-
Average	145.7	145.9
Poor	251.6	186.2
Total	508.7	438.6

b) between groups

Items of Dale-Chall Rating		Group T errors	Group N errors
1.	Common	77.9	49.0
2.	Known	32.1	2.1 NS
3.	Rare	-	-

Dale Chall rating affects the ability of the two groups of less fluent readers to restore the exact word, V. The results for error pattern must be seen in relation to the small number of Known and Rare items and, in particular, to the fact that the errors of syntax occur almost exclusively on Common words thus distorting the theme related results for other columns.

d Sentence level description:

Table II.12: Patterns of response related to Sentence Length

Sentence Length in Words	V	S	Z	Total T	Total N	Group T Errors TS	TV	TE	TH	TR	Group N Errors NC	NH	NP	NN
<10 (15)														
Good	62	16	0	20	2	17	17	60	4	1	86	0	7	7
Average	51	14	2	26	7	14	13	63	7	3	69	13	5	13
Poor	33	10	10	30	17	16	16	53	7	7	57	12	7	24
TOTAL	49	13	4	26	9	16	15	58	6	4	63	11	6	19
10 - 11 (10)														
Good	47	23	1	27	3	3	19	72	6	0	71	0	21	8
Average	36	19	3	36	6	9	18	57	13	3	54	7	31	7
Poor	21	14	12	40	14	18	16	41	21	5	25	2	33	39
TOTAL	34	19	5	34	7	11	17	55	14	3	38	3	31	27
12 (8)														
Good	55	29	0	15	1	0	40	60	0	0	50	0	0	50
Average	46	28	1	22	3	0	42	57	1	0	19	0	5	16
Poor	33	19	8	26	13	1	35	56	5	3	44	3	10	43
TOTAL	45	26	3	21	5	0	39	57	2	1	50	2	8	39
13 (8)														
Good	60	20	1	11	8	2	25	15	56	1	2	0	93	5
Average	39	25	2	21	14	3	32	17	47	1	4	5	81	10
Poor	23	23	8	25	21	4	35	18	41	2	6	16	55	22
TOTAL	41	23	3	19	14	3	32	17	46	1	5	10	70	15
14 (8)														
Good	73	12	0	14	1	47	9	41	3	0	50	0	0	50
Average	56	10	2	26	5	33	11	47	7	2	56	15	21	8
Poor	30	7	15	31	16	36	11	39	8	5	57	10	8	24
TOTAL	53	10	6	24	7	37	11	43	7	3	57	11	11	21
15/16 (11)														
Good	61	19	1	17	3	2	48	33	18	0	7	25	64	4
Average	44	21	2	26	7	2	36	39	23	1	7	18	55	20
Poor	23	14	13	32	17	2	32	36	25	6	4	34	41	21
TOTAL	43	18	5	25	9	2	37	36	22	3	5	29	47	19

Table II.13: Patterns of response related to sentence type

Sentence Type	V	S	Z	Total T	Total N	Group T Errors TS	TV	TE	TH	TR	Group N Errors NC	NH	NP	NN
Simple (35)														
Good	52	22	1	22	2	7	34	50	7	1	60	6	25	9
Average	41	20	2	30	7	8	29	47	13	3	47	13	22	19
Poor	25	14	12	32	16	12	25	40	18	6	36	16	18	30
TOTAL	39	19	5	28	9	9	29	45	13	3	41	14	20	25
Compound(10)														
Good	68	10	1	13	8	8	13	62	16	2	16	15	68	1
Average	50	9	3	21	18	11	15	56	18	0	22	23	51	3
Poor	26	6	11	28	29	18	16	47	16	3	25	23	35	16
TOTAL	48	8	5	21	18	13	15	53	17	2	23	22	45	10
Complex (15)														
Good	65	19	0	14	1	2	36	44	17	0	14	14	43	28
Average	46	22	1	26	4	2	34	46	16	1	14	16	45	24
Poor	30	17	8	32	13	2	35	45	14	4	19	22	27	32
TOTAL	47	19	3	24	6	2	35	45	15	2	18	20	32	30

Table II.14: Values of chi-square in Tables II.12 and II.13

			Group T Errors	Group N Errors
a) Within groups of readers				
1. Sentence Length		Good readers	194.5	-
		Average readers	200.7	129.7
		Poor readers	240.6	235.3
		TOTAL	579.7	458.6
2. Sentence Type		Good readers	40.7	46.4
		Average readers	41.8	68.3
		Poor readers	67.3	52.8
		TOTAL	119.0	168.1
b) Between groups of readers				
1. Sentence Length	< 10 words		21.1 x	12.1 NS
	10/11 words		86.1	30.6
	12 words		-	-
	13 words		4.3 NS	31.5
	14 words		12.1 NS	-
	15/16 words		25.3 x	10.9 NS
2. Sentence Type		Simple	103.1	31.6
		Compound	15.4 NS	40.6
		Complex	10.8 NS	1.7 NS

While sentence length and sentence type both cause significant differences in response within the groups of readers, it is only on simple sentences and sentences of ten or eleven words that between group differences are significant when readers are working within the theme of the text. Errors of category NC show that Poor readers are better able to handle simple sentences as complete units than the more complicated sentence types but the two more skilled groups found deletions from complex sentences easier to restore than those from simple sentences. This may of course be due to a variety of interacting factors. All groups were more likely to lose the theme of the text on compound sentences.

e **Predictability and error patterns:**

Table II.15: Patterns of response on items of High and Low Predictability compared

Predictability	V	S	Z	Total T	Total N	Group T Errors TS	TV	TE	TH	TR	Group N Errors NC	NH	NP	NN
High (31)														
Good	67	23	0	8	2	3	41	52	4	0	61	8	28	3x
Average	56	23	1	14	6	1	31	60	5	3	47	9	24	21
Poor	39	19	10	19	14	5	26	54	7	8	41	13	20	26
TOTAL	54	21	3	13	7	3	31	55	6	5	44	12	22	22
Low (29)														
Good	49	16	1	30	4	7	29	51	12	1	22	12	56	10
Average	31	15	2	41	10	9	28	44	17	2	26	22	42	9
Poor	14	9	12	44	21	13	26	36	21	4	23	23	27	27
TOTAL	31	14	5	38	12	10	27	43	17	2	24	22	35	20

x = based on less than 100 reponses

values of chi-square a) within groups of readers

	Group T errors	Group N errors
Good	20.1	-
Average	74.4	14.4 x
Poor	107.7	21.6
Total	181.4	89.1

b) between groups of readers

High predictability	43.4	10.4 NS
Low predictability	80.1	58.7

Predictability, which may be described as the total information at all levels within the text obtained before the deleted word is reached, was again found to be a significant influence on responses within and between groups. Unlike the study reported in Chapter 6, between group differences on items of High Predictability reached significance levels when the subjects were working within the theme of the text. Good readers produced only ten per cent errors on items of High Predictability compared with thirty-five per cent on items of Low Predictability. The development of the ability to make use of 'predictability' is therefore a key distinguishing feature of the fluent reader in secondary school; if highly predictable elements in a text can be processed so easily, attention is freed for higher or deeper levels of processing and for dealing with those parts of the text which are not so predictable.

APPENDIX III

From Chapter 3:

1 Comparisons between cloze tests must be based on the same texts.

2 Line-length and spacing do not affect failing readers' responses to cloze tests; gaps at the ends of the lines give rise to a larger than normal number of errors.

3 Errors increase as the subject proceeds through the test.

4 Decoding difficulties make some contribution to cloze scores.

5 Deletion rate affects cloze scores but interacts with the form class of the words deleted.

6 Grammatical form class of deleted words affects syntactic and semantic constraints.

7 There is an interaction between successive deletions within sentences.

8 Cues to grammatical form class and word form are generally found within five words from the deleted words; meaning cues require a wider range of text to be taken into consideration. Five word segments are important in the completion of cloze tests.

9 Text frequency affects ease of restoration.

10 The first word in a sentence is more difficult to restore than any other.

11 There is a significant difference in scores on different types of text; narrative, informative and instructional groups formed on the basis of subjective judgement were found to have a reality in terms of variation in cloze scores.

12 Verbatim, semantically acceptable and form class scoring systems yielded different and valuable information.

13 There is a significant difference in difficulty between noun and verb deletion.

14 The physical presence of a gap in the text did not adversely affect the performance of failing readers.

15 The ability of the group to recognise the position from which a word had been deleted was greater than their ability to restore it.

16 The degree of difference between the ability to locate and the ability to restore was related to the form class of the word deleted.

17 Nouns and pronouns are more affected by the lack of use of information from beyond the sentence than verbs.

APPENDIX IV: A small scale longitudinal study of the effects of the remedial programme

Those pupils who had taken part in the remedial programme in 1982-83 received no further remedial education during the following school year. They were then re-tested on both the Schonell R3 and the cloze test.

Table IV: Results of re-testing

Subject		R.A.*	V	S	Z	TS	TC	TV	TE	TH	TR	NC	NH	NP	NN	Total T	Total N
12	a	8y7	11	9	0	3	2	6	4	6	0	9	2	4	4	21	19
	b	13+	28	9	0	0	2	5	8	1	1	2	3	1	0	17	6
6	a	8y2	11	11	1	3	2	4	2	5	5	4	5	4	3	21	16
	b	13+	9	6	21	0	0	4	6	3	1	5	1	3	1	14	10
7	a	7y6	13	5	0	3	0	7	3	8	4	3	6	2	6	25	17
	b	13+	24	10	1	0	0	8	5	2	0	4	2	3	1	15	10
8	a	8y7	17	6	1	3	0	4	5	4	3	5	3	4	5	19	17
	b	10y3	33	6	0	0	1	6	9	3	0	1	0	1	0	19	2
13	a	8y7	14	8	0	2	0	6	9	6	0	7	3	2	3	23	15
	b	13+	27	11	0	0	1	3	7	3	0	2	0	3	3	14	8
14	a	8y11	16	10	5	2	0	3	7	4	2	3	3	3	2	18	11
	b	13+	26	10	11	0	1	1	4	2	0	3	0	1	1	8	5

a = score on pre-test b = score at June, 1984 re-test

* Schonell test may have ceiling effect at reading ages over 12 years.

The reading ages of the pupils continued to rise and the pattern of responses continued to resemble that of normal readers for one year after remedial support was withdrawn.

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